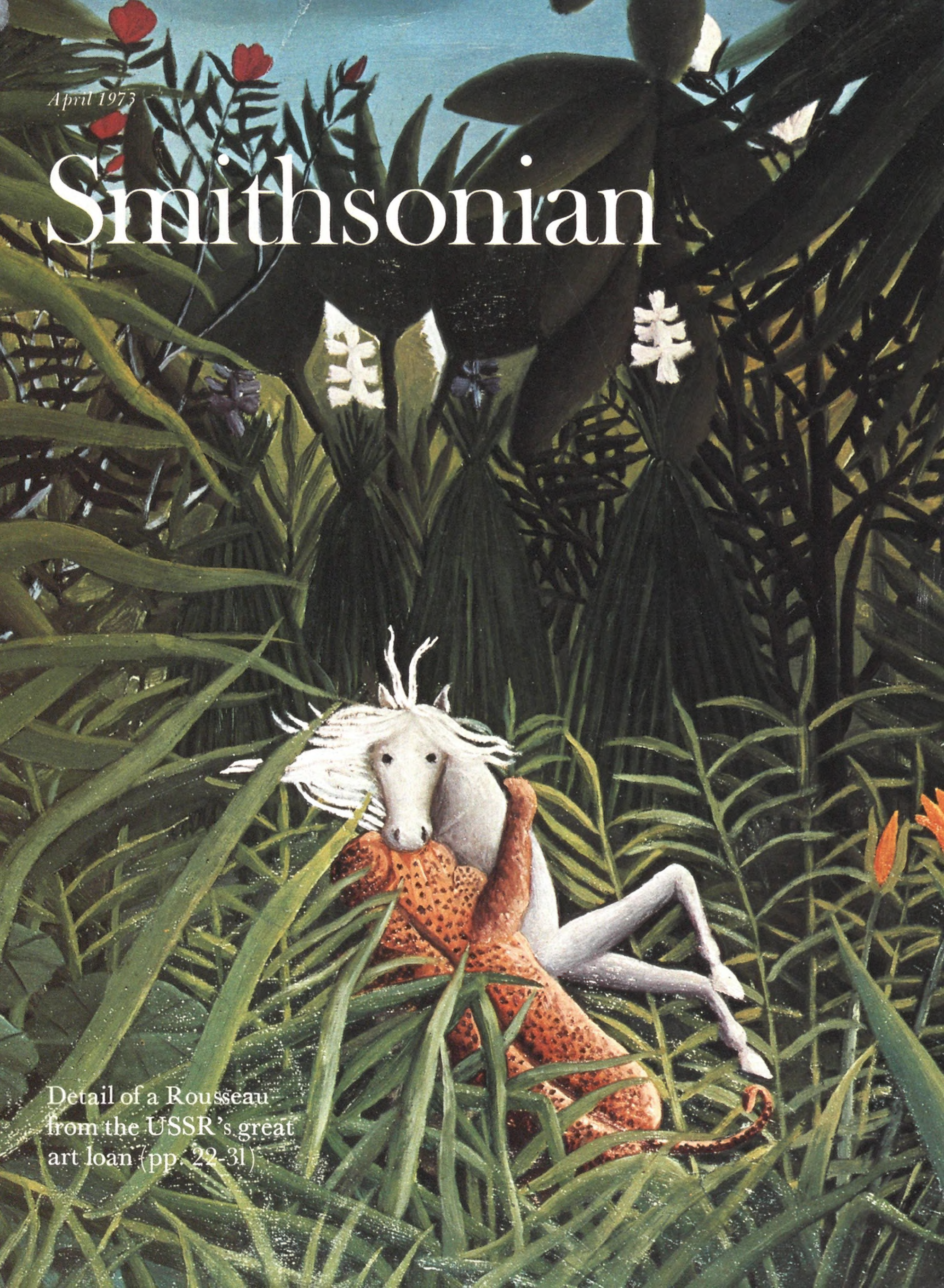
April 1973

Smithsonian



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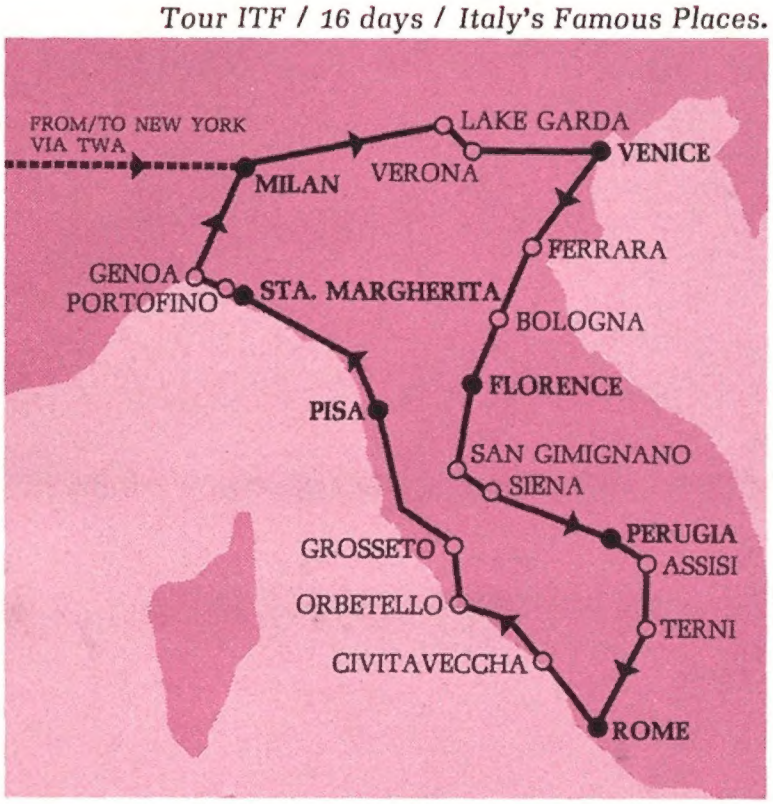

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April 1973

Smithsonian

Volume 4, Number 1

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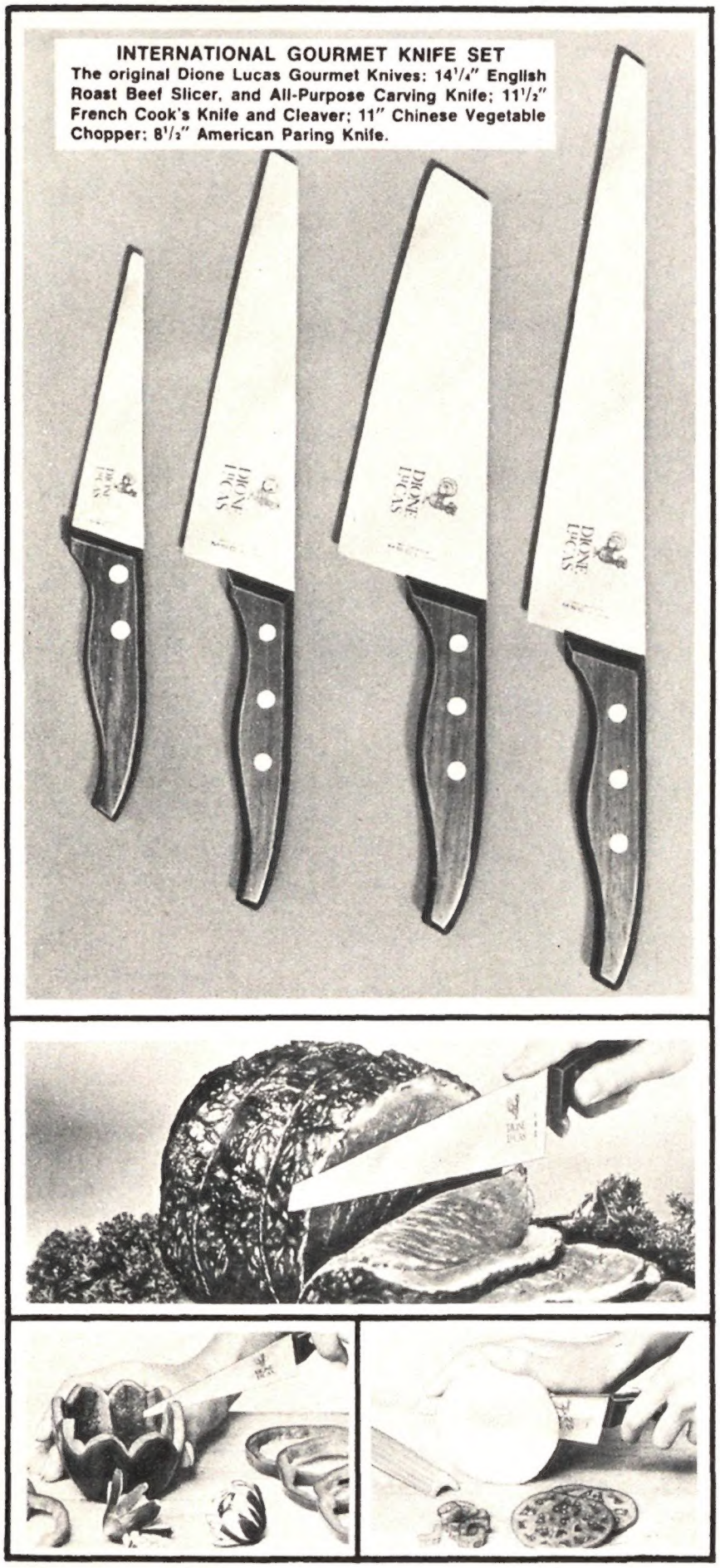

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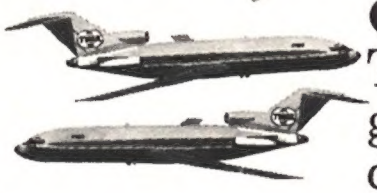

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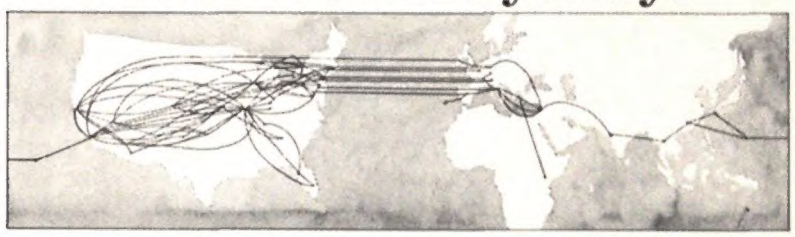

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Secretary Ripley's comments

The view from the castle

The coastal nations of the world will meet to try carving up the oceans. A chief loser from this could be the marine sciences

Recently a scientist from the Smithsonian Tropical Research Institute in Panama expressed horror over the fact that many Caribbean nations hold a concept of "patrimonial seas." They claim sovereign rights over the seabed *and* waters for 200 miles seaward and, except for certain straightforward matters of transit, no marine activities including research may take place in such zones without the coastal nation's permission. The Smithsonian scientist foresaw the "dark ages" of ocean science if this were to become the common practice. In fact, it *is* increasingly common. The oceans are being carved up. A host of nations—both rich and poor, northern and southern—have taken actions to extend their oceanic sovereignty, some farther, deeper and more exclusive than others.

The reasons are many: military considerations, fishing, deep-sea mining, oil and gas recovery, even national prestige. And within the coastal nations, including the United States, these various interests have drawn their new, often conflicting maps of the sea.

Some gunboat diplomacy and several years of negotiation have now led to a United Nations Conference on the Law of the Sea which will begin late this year. It will surely be a long, complicated series of wrangles and many voices will be heard. One voice that has been little heeded so far is that of science.

To a great extent marine science is the province of a few rich nations, looked upon with suspicion by many developing nations still smarting from the wounds of colonialism. Rightly or wrongly, a foreign research vessel offshore presages for them another round of exploitation. Even well-equipped nations are finding compelling reasons to be restrictive.

Of course, it is often hard to distinguish between scientific and commercial research. And one man's oceanographic study may be another's military intelligence. Yet some distinctions can be made. Satisfactory modes of information exchange can be developed. Sophisticated leaders can devise proper criteria.

Whatever arrangements the 118 coastal nations eventually reach concerning commercial, military and other rights to various parcels of ocean, they would be wise to seek and find the means of providing maximum freedom of access for legitimate marine research. After all, many of the benefits that nations now suddenly perceive in their offshore waters are very precisely the long-term fruits of the unfettered curiosity of marine scientists.

Without continuing scientific endeavor in their waters, the less-equipped nations will delay the development of their own marine science capabilities, without which they cannot conceivably manage their ocean resources successfully.

Furthermore, Man has just begun to understand the ocean ecosystem and its dynamic role in the environmental well-being of even the landlocked. To build on this indisputably requires cooperation and wide-ranging research.

To be sure, scientists must henceforth be sensitive, even sympathetic to the changing political realities of the oceans. But it would be shortsighted in the extreme for coastal nations to foreclose or even impede unnecessarily the progress of ocean science.

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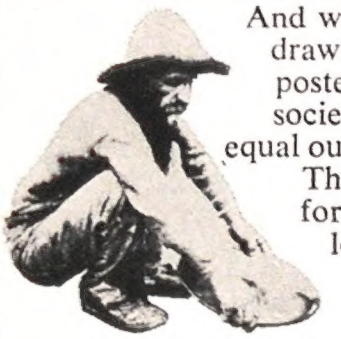

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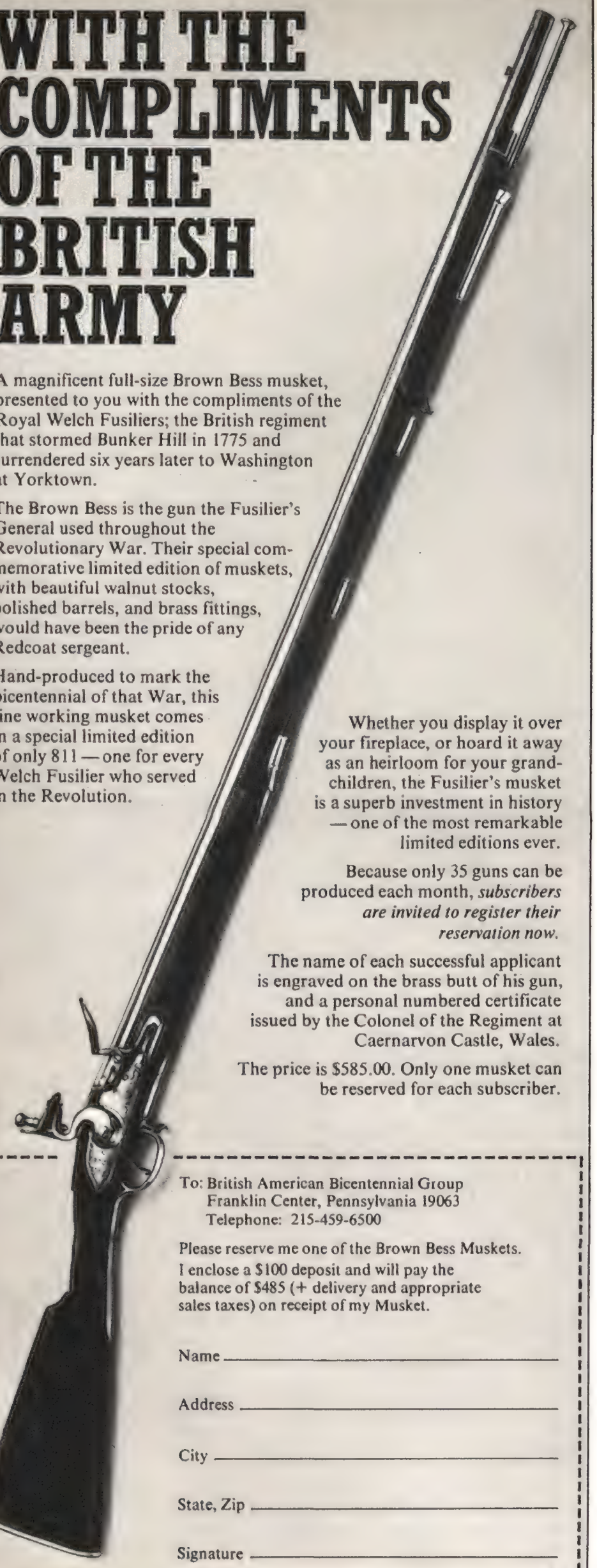

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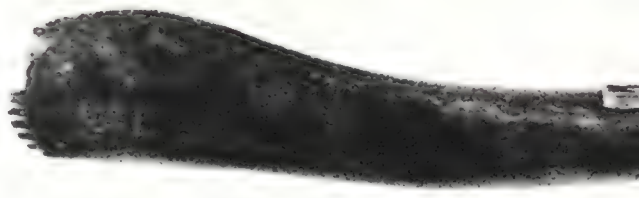
Phenomena, comment and notes

The first Americans, an ecologist barks at the dogs, mice cubes and a sad tale of Scotch and water

The Detroit River became a candidate for the worst place of them all when, according to *Living Wilderness* magazine, 264,000 bottles of Scotch fell into it from a barge. The bottles were all retrieved unbroken. What must have seemed like a very bad dream then turned into a full-blown nightmare when the Food and Drug Administration hauled off the entire shipment, crushed it and buried it. "Anything," said the FDA firmly, "that has been submerged in the Detroit River is contaminated."

Earliest humans in America

The whisky-withering Detroit River is not to be confused with the lesser known Old Crow River which runs northwestward in Canada, a few miles from the Alaskan border. Here W. N. Irving of the University of Toronto and C. R. Harington of the National Museums of Canada in Ottawa have turned up the earliest incontrovertible evidence so far of the hand



The earliest known human artifact in America: shown at half-size, the tibia

of man on the North American continent.

It had previously been supposed, from ample evidence, that humans arrived via a land bridge that formed across the Bering Strait some 12,000 years ago after the last glacier began to withdraw. But along the Old Crow River, the two Canadians discovered the tibia of a caribou which had clearly been carved by a sharp stone implement. The bone had well-fashioned notches, or teeth, whittled into one end and was most likely used for cleaning hides. Also they found two bones from mammoths and these fossils showed signs of being broken, when fresh, by man. The three artifacts were analyzed, using the radiocarbon dating technique, and found to be between 25,000 and 32,000 years old.

So it appears that humans reached these shores from Siberia before the last glacier had receded, following their prey—the caribou and mammoth—across an even earlier land bridge that came into being when formation of the glacier lowered the level of the sea.

of a caribou with teeth carved into end (left) was used for fleshing hides.

Alice in Eco-Land

The following conversation, reported by Dr. Thomas Jukes of the University of California at Berkeley, appeared in *Nature* magazine.

"I see," said Alice, "that the *Sierra Club Bulletin* has an ad for boots made of mustang leather, and a long article asking us to protect wild horses. Why?"

"Because," said the Mad Hatter, "the word 'mustang' in the ad only means that the boots are mustang color. The leather is cowhide, so everything is ecological."

"But," said Alice, "cows spend their lives giving us milk. They are very friendly. Why do we make them into boots and hamburger, if we protect mustangs?"

"Cows are not an endangered species," replied the Hatter, "they are only endangered individuals. They are not part of

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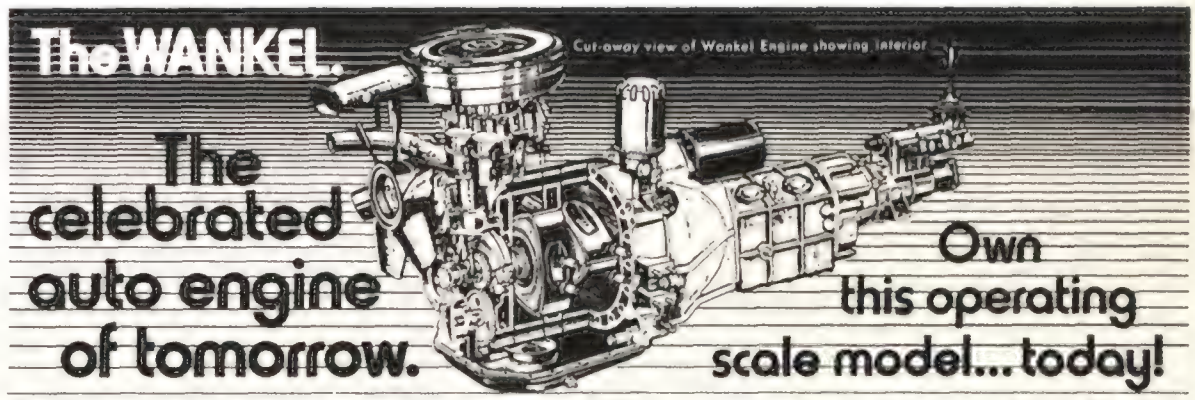
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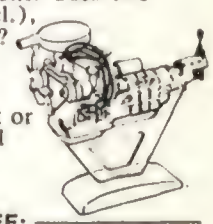

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the web of life. So they don't matter."

"Why are mustangs an endangered species?" asked Alice. "They are just horses that have run wild. There are lots of tame horses. If a cow ran wild, would it be an endangered species?"

"No," said the Hatter. "It would be rounded up, and made into hamburger."

"If I were a cow," said Alice, "I would ask a genetic engineer to make me into a mustang."

The Sierra Club had no comment.

Programmed paranoia

People who have found themselves with growing feelings of paranoia over their treatment, or lack of it, at the hands of computerized systems of one sort or another, will be interested to hear that at least one computer has been judged paranoid itself by 23 out of 25 psychiatrists who examined it.

The machine in question was deliberately programmed to make paranoid responses—via teletypewriter—in an experiment in which several scientists at Stanford University attempted to create a theoretical model of paranoia. According to *Scientific American,* the next step is to see if the computer will turn up "properties of paranoia not yet discovered in patients." And the next step after that is to try and cure the machine, which seems the only fair thing to do under the circumstances.

Save the shells

Most of a lobster, crab or shrimp is waste (between 75 and 83 percent, in fact) once the insides have been eaten. The Department of Commerce was forcibly reminded of this when they found the shellfish industry getting itself on a collision course with marine pollution regulations by dumping tons of these useless shells back into the sea. But it was the beginning of the age of recycling and the Commerce Department funded a processing plant in Seattle which removes chitin (pronounced kite-n) from the shells. Chitin is a cellulose-like material that holds together the shells of these crustaceans (as well as the exoskeletons of most insects, to which the crustaceans are related).

It sounds as though Commerce is on to a good thing: So far chitin and its derivative, chitosan, have proved valuable in such varied activities as treating wounds

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Now, what about those insects?

The icedman cometh

Remember that loony-sounding idea a few years back to freeze people who had incurable diseases and keep them on ice until someone came up with the cure? We may have moved a step nearer to realizing such a technique. At Oak Ridge National Laboratory, mice embryos were taken some 22 to 96 hours after conception and cooled down to temperatures hundreds of degrees below zero where no chemical reaction can take place. Subsequently the embryos, consisting of anywhere from one to 150 cells, were slowly thawed out and implanted in foster mothers. Seventy percent survived to develop into perfectly normal mice and a few have gone on to become grandparents.

Who's next?

The fault of the Midwest

By now everyone in California knows that one day soon there will be another major earthquake along the San Andreas Fault. Scientists are busily developing techniques, like measuring fault creep, to predict the precise time of the event.

But the worst American earthquake occurred in the stable, solid Midwest. In 1811, says the *Field Museum of Natural History Bulletin*, a quake began in what is now Missouri, collapsed chimneys 350 miles away in Cincinnati and woke people in Washington, D.C. And the faults are still there, relatively unstudied but probably still creeping.

The case against a sacred cow

Anyone who lives in a city knows that dogs are a nuisance—well, at least everyone else's dog is. Just how great a nuisance has been documented in an extraordinary little book called *The Ecology of Stray Dogs* by Alan M. Beck, based on fieldwork he did in Baltimore while at Johns Hopkins University. By stray dogs he means free-ranging ones—the ownerless type and your own dog when it is out by itself.

Among his findings are the following counts against man's best friend. Each year about 700 people per every 100,000

city dwellers are bitten by dogs; most of the victims are 15 years old or younger. Almost half the bites are inflicted by mongrels, while German shepherds are by far the most dangerous of the purebreds. Females bite more than males, younger dogs more than old ones. Running from a threatening dog appears to heighten the chance of being bitten. Significantly, most dog bites are inflicted by pets near their owners' homes.

Ten times more people are bitten by the beloved dog than the hated rat. In fact, dogs are something of a comfort to rats: They tip over trash cans, making it easier for the rats to forage, and Dr. Beck has watched dogs chasing away cats which were chasing rats. Rats (as well as pigeons) can apparently do fine on little more than a diet of the dog excrement that fouls city sidewalks. This unpleasant stuff not only is credited with doing away with maxi coats, but it attracts and affords a breeding ground for flies, overfertilizes grass, kills trees and is sufficiently abundant to add to water pollution problems when it runs off in storm sewers. Also, it transmits a variety of diseases to humans. from worms to tuberculosis.

Furthermore, dogs bark. Indeed, nervous city dwellers encourage barking and, as Dr. Beck points out, "In a city filled with unpredictable and uncontrollable noises, dog barking is yet another potential for lowering the quality of life."

For municipal officials seeking instant unpopularity, Dr. Beck's book contains various suggested remedies.

Do you know where your dog is today?

The Formation of Islamic Art

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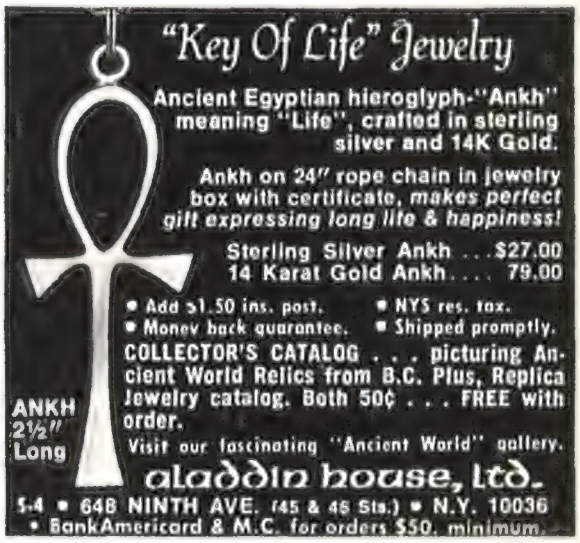
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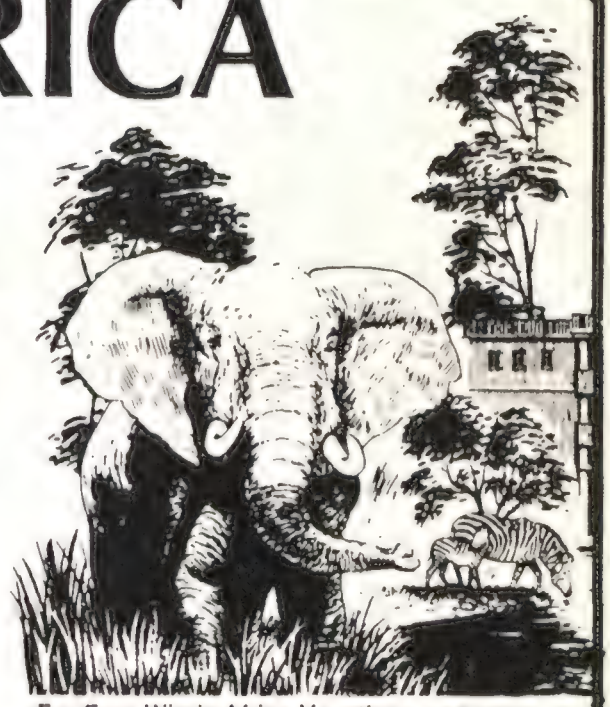

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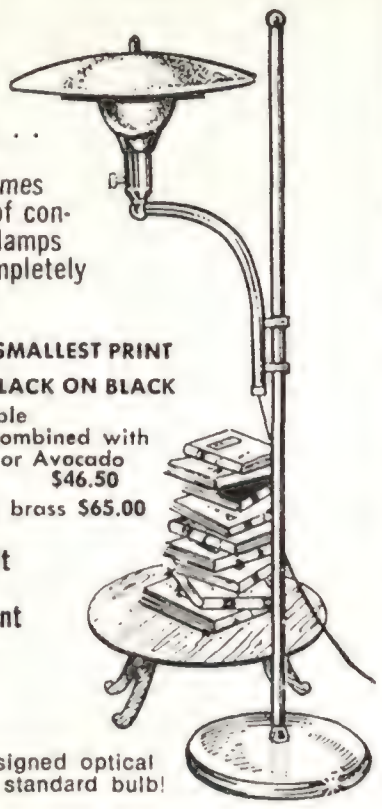

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Letters to the Editor

Coal gasification

Dear Sir: Jane Stein's informative article in the February issue, "Coal is cheap, hated, abundant, filthy," after indicating that this fuel offers a short-term answer to the U.S. energy crisis, contains some provocative arithmetic.

The figures that intrigue me are that in 1970, strip-mined coal sold for $4.69 a ton while deep-mined coal was $7.40 a ton, followed by the statement that "meaningful reclamation of strip mines would add . . . from 10 cents to 50 cents per ton of coal."

These two sets of figures, taken together, make the whole thing absurdly simple. Even if meaningful reclamation adds an additional 50 cents per ton to the cost of strip-mined coal, the differential in its favor would still be $2.21. The point seems to be that adequate rehabilitation of the ravaged land would add only about 10 percent to the overall cost, and that the high efficiency of strip mining could easily support this surcharge.

Henry Wright
New York, New York

Dear Sir: Your article quotes John McCormick of the National COALition *Against Strip Mining* as saying: "Plant roses if that's what will produce the best results." I would like to paraphrase this to say "crownvetch" in place of "roses."

Since 1955, the excellent results on strip-mine spoils have come from planting a mixture of grasses and legumes, including a top performer—*Penngift crownvetch*. Ohio is an example where thousands of reclaimed spoil areas are producing huge tonnages of prime beef,

with beauty, soil-building and erosion-control thrown in as a bonus. I know because I sold Hanna Coal Company their first pound of seed in 1955.

We do not need to *stop* stripping; we *do* need to *enforce* revegetation.

Fred V. Grau
Consulting agronomist
College Park, Maryland

A good ground cover, crownvetch retards competition from other plant life; however, it does not provide a complete diet for cattle except at certain seasons. Ed.

Dear Sir: I lived in New Mexico when the Four Corners Power Plant was under construction. At that time, there was a widely publicized plan to catch the fly ash and use it as an aggregate for building blocks. Is this process in operation?

C. A. Randall
Department of Physics
Ohio University
Athens, Ohio

No. The reason given is the difficulty and high cost of transporting the blocks. Ed.

Dear Sir: I have long believed in the ability of technology to provide us with answers if the need is desperate enough—and surely the need to find nonpolluting power plants falls in that category.

One promising pilot project is the Applied Technology Corporation of Pittsburgh's Two-Stage Coal Combustion process. It permits the burning of high-sulfur coals in power plants without the generation of a sulfur dioxide pollution problem. In the process, coal is dissolved in a molten bath of iron prior to burning with air. In another step, sulfur and other constituents of the coal are separated; later, elemental sulfur is recovered. Since the sulfur does not burn, no sulfur oxides are produced, eliminating expensive scrubbing equipment.

I think this would be great at Four Corners and like places.

Ray DeBurgh
Palm Springs, California

Although this process of recovering elemental sulfur is not unique, the Environmental Protection Agency considers it promising enough to support it on a pilot scale. Most important to EPA is that the melted sulfur can be formed into solid blocks and stored for years, if necessary. Ed.

Dear Sir: I think I have spotted two er-

Courtesy N.H. Historical Society.

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rors in your February issue. The first is a statement that coal gas was used for lighting in the "late 18th century." Surely the author meant the late 19th century.

The other questionable fact occurs in Dora Jane Hamblin's fine article on the Sperlonga Archaeological Museum. Baldo Conticello, in earlier articles, shows Ulysses' ship upended with the rest of the ship already sunk beneath the water. Instead of your photograph (see below) with the caption referring to "the reclining figure of the helmsman," you should have said the helmsman was hanging on for dear life.

Clay Watson
New Orleans, Louisiana

In answer to Mr. Watson's first point, coal gas was discovered as an illuminant by William Murdock of Great Britain and was first used there in 1798. In the United States, it was first used at the Peale Museum in Baltimore in 1816.

As to the second, all theories about the original form and placement of the Sperlonga sculptures are still conjectural, including, as Conticello says, "some favorite ones of my own." The fragment of Ulysses' ship was mounted in the museum in the position shown at the time it was photographed (note ceiling in photograph below). Ed.

Graffiti

Dear Sir: As a Peace Corps volunteer recently returned to this country after three years abroad, I was shocked to see how New York City's subways have been vandalized in my absence. But I was even more shocked at the indulgent treatment

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this subject received in SMITHSONIAN (William Vandivert's article "Mobile Graffiti in New York . . .").

Surely Mr. Vandivert's lighthearted permissiveness will only encourage would-be vandals to expand their campaign of senseless scrawling and to uglify private as well as public conveyances.

Andrew L. Strasfogel
New York, New York

Dear Sir: The recent article on graffiti was a noteworthy example of seeing things without the usual preconceived notions of esthetic taste and puritan morality. Graffiti are an attempt physically to redesign an environment for varying reasons and should portray the likes and dislikes of various ethnic groups, but, as the city changes, graffiti change. The quality of the environment will determine their next form.

Kathryn Filla
New York, New York

Phenomena, comment and notes

Dear Sir: The artichoke, pictured in your February issue, might alter your taste but not the correct spelling of Castroville, World Artichoke Capital.

Boone Crow
Oakland, California

Apologies to the citizens of Castroville. It is there that artichokes are grown in abundance. Castro, on the other hand, is either a Cuban or a convertible sofa. Ed.

Mightier than the tomahawk

Dear Sir: The truth is that the "Indian" Head penny bears the portrait of a white child. Six-year-old Sarah Longacre posed in the headdress of an Indian chief who was visiting the mint with a delegation. Her father, chief engraver of the United States Mint James Barton Longacre, submitted the sketch and it was adopted. Poor Sarah! No one believes her story. As a descendant, I would like to set the record straight.

Mrs. J. E. Bedford
Fresno, California

The charming legend about Sarah Longacre's posing for the Indian Head cent, though widely propagated, has never been authenticated. The Bureau of the Mint maintains that Longacre's sketch clearly shows a mature woman of rather idealized Grecian features. Ed.

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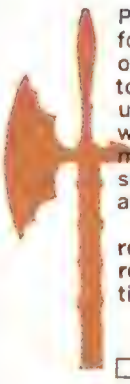

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Russia sends us a prize package of modern French paintings

A loan arranged by Dr. Armand Hammer will give many Americans a first glimpse of famous collections in Moscow and Leningrad

Less than a month ago, cargoes more valuable (and, to contemporary taste, far more significant) than the Czarist crown jewels arrived in the United States aboard a series of routine commercial flights from Russia. In an unprecedented gesture of good will and cultural propaganda, the Soviet government has sent to this country for exhibition 41 modern French paintings from its fabled collections in Leningrad's Hermitage and the Pushkin Museum in Moscow.

Although these important works are known to scholars, largely through photographs and art pilgrimages to the USSR, they have been seen by relatively few Americans. That they are coming here at all is largely owing to the deft intervention of Dr. Armand Hammer, an American oil magnate who has amply demonstrated his talent for dealing with Moscow. They will be on view at the National Gallery of Art in Washington from March 31 through April 29, and then at the Knoedler Gallery in New York—of which Dr. Hammer is chairman—from May 3 through May 26. After that, back to Russia.

According to Dr. Hammer's disarming explanation, it all began about a year ago during an exhibition of part of his own collection of European and American paintings in Los Angeles. Among those who saw it there was the Soviet minister of culture, Mme. Yekaterina Furtseva. She asked whether it would be possible to have the pictures go to the Soviet Union. Since they were already scheduled for London and Dublin, Dr. Hammer said that it was indeed possible. They went,

Paul Cézanne, *Study of Bathers* (1890-94). This is one of five Cézannes in the show that were in the original collection of Ivan Morozov.

By Carol Cutler

Pushkin Museum, Moscow

Hermitage, Leningrad

Henri Matisse, *Still Life with Terrine* (1900).
In this early work Matisse was still using
well-defined volumes and three-dimensional space.

Opposite: *The Blue Cloth* (1909) shows how
Matisse had flattened his perspective in nine years.

and 300,000 saw them in Leningrad, double that number in Moscow—where people queued up for hours in 20-below temperatures. In the light of this success, Dr. Hammer suggested that a return exhibit might be in order. Asked what kind of paintings he would be interested in, he said, "Your Impressionists and Post-Impressionists, because they have never been seen in my country."

The prize package that Dr. Hammer thus tied together includes seven paintings by Matisse, seven by Gauguin, six by Picasso, five by Cézanne, three by Van Gogh, two each by Rousseau, Renoir, Monet and Derain, and one each by Braque, Sisley, Léger, Vlaminck and Pissarro.

Many of them are of major importance in the evolution of modern European painting. For the most part they are drawn from the strong collections originally put together by two wealthy Moscow merchants, Sergei Shchukin and Ivan Morozov. These remarkable men were part of the revolutionary artistic ferment that seethed among Russians during the early years of this century. It was a time of creative breakthroughs in music, dance, theater, literature and art, achieved by such pioneers (many of whom later left for the West) as Igor Stravinsky, Serge Diaghilev, and the painters Mikhail Larionov, Natalia Goncharova, Vassily Kandinsky, Sonia Delaunay, Kasimir Malevich and Marc Chagall.

As part of this scene, Shchukin and Morozov were naturally prepared to accept Western Europe's avant-garde painting. Although both were voracious collectors of modern work, their interests had a broader range. They supported Russian artists to an even greater degree than they did their French contemporaries. An inventory of the Morozov collection after it was seized listed 430 Russian works and 240 French.

Both men opened their homes to the public every Sunday morning. Shchukin would personally greet the several hundred visitors who filed through. By special appointment, the collection was open to students and scholars all week long. Morozov's home was similarly accessible. Although they vied with one another for the paintings they bought, there was no jealousy between them. Morozov called his collection "The Second Museum of Western Art"; Shchukin's, he insisted, was the first.

Shchukin, older than Morozov but more daring, bought some of the most adventurous art of the day. His early appreciation and support of Matisse are

Carol Cutler is an art critic who became familiar with the paintings in this loan exhibition while living in Moscow during the years 1956-58.

Hermitage, Leningrad

legendary. Shchukin bought the greatest paintings that the artist produced prior to 1914, which explains why they are essential to any study of Matisse's work. The output of all the other artists represented in this Soviet loan was more widely dispersed during these years, and good examples can be seen elsewhere. Matisse is the revelation.

In 1908, an important year for Matisse, he had his first New York exhibition, plus others in Moscow and Berlin, and Shchukin bought his magnificent *The Dinner Table (Harmony in Red)* at the Salon d'Automne in Paris. Although what Shchukin had seen and bought in Paris was a blue composition, the painting arrived in Moscow as a medley of reds. Matisse was notorious for reworking canvases until he perfected their color pitch, which explains the surprise Shchukin received. A year later the artist borrowed some of the blue baroque configurations in *The Dinner Table* and created an entirely new version, *The Blue Cloth,* which is in the current show (page 25). This is interesting to compare with *Still Life with Terrine* (page 24), painted in 1900 and also on display. Another progression in Matisse's work becomes clear: In the rosy-hued early composition, the tabletop is crisply defined and separated from the perpendicular wall; nine years later, in his arabesque of blues, Matisse blends wall and table into one dramatic sweep.

Picasso was another Shchukin favorite. Although Shchukin appreciated Picasso's early Cubist paintings, he was quite aware of their contrast with his Matisses. The latter were sunny and full of the joy of life, while Picasso's work in this period was marked by the restrained use of a palette limited mostly to grays and beiges. In the dark anticipatory days just before the

Pushkin Museum, Moscow

October Revolution, Shchukin handed photographs of the somber Picassos to an American diplomat friend with these words: "Take them to America, they are a parable of the Russian revolution. Don't you see? It *is* Russia."

After the 1917 revolution, the Morozov and Shchukin collections, along with vast amounts of other private property, were nationalized. Current Soviet writing attempts to give the impression that only after they were confiscated were these collections visible to the public. Not so. As we have seen, both Morozov and Shchukin showed their collections to the public on a free and regular basis.

Faith in good intentions

At first the Revolution did not diminish the feeling of great optimism and artistic freedom in political and cultural circles. Morozov was appointed assistant director of his own collection, and was permitted to live in three rooms in his former mansion. Among his duties were compiling a catalog and guiding visitors through the museum. He even spoke sympathetically of the new spirit and of the good intentions of the Bolshevik minister of education, Lunacharsky.

His faith was well placed—for about a decade. A Museum of Western Modern Art was founded in Moscow that consisted of 462 paintings, most of them from the Morozov and Shchukin collections. But cultural suppression was not far behind, and as Stalin consolidated his dictatorship, the museum was closed. Worse still, the collections were completely hidden from view and remained so for more than 20 years. "Socialist realism" became the only officially accepted artistic expression, while modernist painting was condemned and banned.

Not until late 1955, two years after Stalin's death, were some of the modern paintings once again shown to the public. Then an exhibition of French Impressionists opened in Moscow. A few early Picassos (such as the one on pages 26–27) were included, hardly a daring step in the mid-1950s. Nevertheless, long lines of Muscovites waited patiently to see the show, and the snaking queue became a familiar sight near the exhibition hall. At the conclusion of that show, some of the paintings remained in Moscow at the Pushkin Museum, while the rest were returned to the Hermitage in Leningrad.

None of them, however, were permanently dis-

Pablo Picasso, *The Couple (The Embrace)* (1900).
A work in Picasso's early style, this preceded his Blue and Rose Periods and his exploration of Cubism.

played until some time later. Visiting art scholars who knew about them could ask to see them. Sometimes permission was granted, sometimes not. By late 1956 part of the modern collection was at last on view in the Hermitage; the Pushkin's went up later still. The Hermitage paintings, at the time, were difficult to find, being tucked away in a badly lighted corner of the top floor. The display improved slightly over the next few years, but it has always been in an out-of-the-way area. All modern Western art is grouped together, including a single room of Americans. It includes artists like Rockwell Kent and William Gropper, who were sympathetic to the Soviet Union. The other Americans are virtual unknowns, but their subject matter is not surprising: mine workers striking against bloated capitalists, Grapes-of-Wrath tenant farmers, and so on.

The official guidebook of the Hermitage states that "the policy of planned distribution of art treasures among the museums carried out by the State, enabled the Hermitage . . . to form a museum free from private taste and opinion; and made it possible to arrange the collections systematically." A study of the collections of modern art in Soviet museums today shows that without "private taste and opinion," modern art stops almost dead as of 1917. Such post-Revolution modern works as are in the collections were given to the state. An example, included in this exhibition, is a large, rhythmic *Composition* by Fernand Léger (at right). The artist, a Communist himself, presented this canvas to the Soviet Union in 1927.

The tantalizing knowledge of what important riches lie in the Soviet collections has preoccupied Western museum directors for years. Occasional loans have come out, only whetting the appetite for more. Some Picassos and Matisses have been particularly well-traveled. The retrospective extravaganzas given both of these artists in Paris were embellished with generous loans from the Soviet Union. The most recent large export package consisted of 25 Picassos, lent to the Museum of Modern Art in Paris a year ago. There were some excellent pictures, but, curiously, the Soviets chose to send mostly inferior paintings to round out the selection. Crowds lined up, nevertheless, despite the fact that the same museum has a first-rate permanent installation of Picasso works, which not too many Frenchmen visit. There is no denying the aura that surrounds any show from those Soviet collections that have been talked about for so long.

The exhibit that Dr. Hammer arranged will almost surely break attendance records in both Washington and New York. It should. This is a selection of masterpieces. As a surprise last-minute inclusion, there is one work by a Russian. This is an abstract painting by the pioneer modernist Kasimir Malevich, whose works are probably valued more highly outside the USSR

Pushkin Museum, Moscow

Fernand Léger, *Composition* (1918). The only example of Léger's work in the exhibition, it was given to the Soviet government by the artist.

Hermitage, Leningrad

Vincent van Gogh, *Arena at Arles* (1888). This view of the bullring at Arles was painted about nine months after Van Gogh settled there.

Paul Gauguin, *Still Life with Fruit, à Mon Ami, Laval* (1888). Morozov and Shchukin avidly collected Gauguins, and together owned almost 30.

Pushkin Museum, Moscow

A prize package from the USSR

than within it. Mme. Furtseva presented it to Dr. Hammer, perhaps not entirely by coincidence, after he had given the Soviet Union a Goya portrait valued at $1 million. This generous gesture was made, his aides explained, after Mme. Furtseva remarked to him in Los Angeles that "You know, we have no Goya in Russia."

In between arranging art gifts and transatlantic exhibitions, Dr. Hammer, who is chairman of the Occidental Petroleum Corporation (see SMITHSONIAN, June 1970), has concluded multi-billion-dollar business deals with the Soviet Union. His association with Russia dates back to 1921 when, as a young doctor just out of medical school, he arrived there with an American relief mission to help fight a typhus epidemic. He

Pushkin Museum, Moscow

Henri Rousseau, *Zeppelins* (1908). This engaging painting is an example of the qualities that brought Rousseau, though a self-taught "primitive," the admiration of the leading artists of his day.

got to know Lenin and received a number of business concessions from him, including a contract to manufacture lead pencils. He remained in Moscow for ten years as president of the A. Hammer Pencil Company, and during that time began collecting art objects and antique furniture.

One question is the value of the paintings that he arranged to bring here. Officials refuse to put a figure on the collection. It has been jointly insured by its American sponsors and the Soviet government for approximately $25 million, but, as Dr. Hammer said recently in Washington, "I would be delighted to be able to buy it for that."

The National Endowment for the Humanities has made a grant of $100,000 to the National Gallery, of which $70,000 will be applied to the cost of the physical exhibit and $30,000 will be used for educational components to go with it. These include a series of lectures by four leading art historians and critics; a brochure containing historical and critical information that will be given free to all visitors to the exhibition; and a color film of the show that will be shown on public television and circulated throughout the country as part of the Gallery's Extension Service Program.

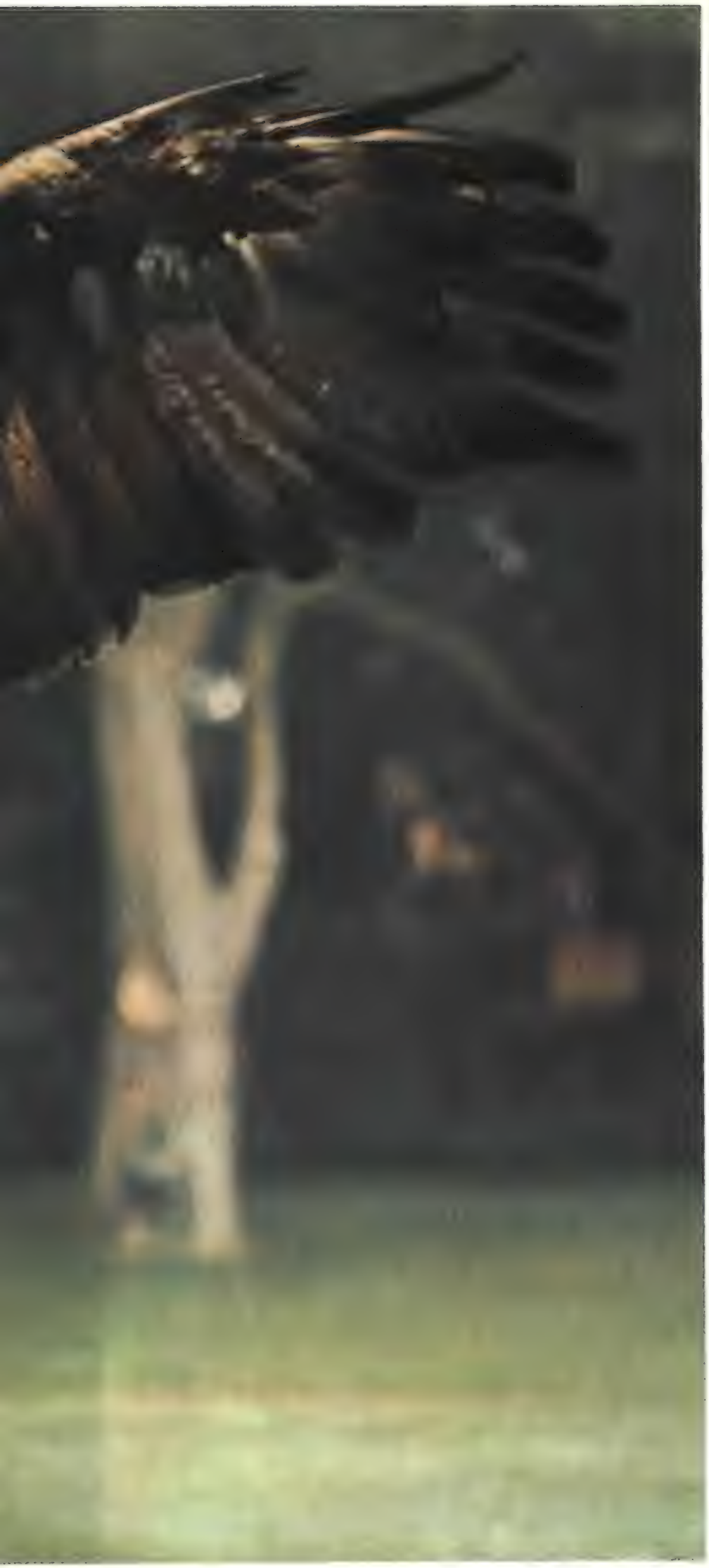
This last project is perhaps the most significant, since the actual paintings can be seen only in Washington and New York, or in reproduction as in these pages. This is too rich a feast not to be shared, which is what Ivan Morozov and Sergei Shchukin had started doing so long ago.

Pushkin Museum, Moscow

Henri Rousseau, *Horse Attacked by a Jaguar* (1910) (See cover). Rousseau's jungle scenes, of which he painted many, are wholly imaginary. This, with its unicornlike horse, is among the most poetic.

With talons extended, a golden eagle named Jupiter swoops in to land on the heavily gloved arm of Rick Rundel, an aviculturist at San Francisco's zoo, where 16 raptorial birds have learned to be free.

Photographs by Nathan Zabarsky



By Maryrose Spivey

A school opens for hunting birds to learn to live

In a program at the San Francisco zoo, volunteers are teaching eagles and other predators the techniques of being free

I was on one side of a long grassy field behind the San Francisco zoo, excited and scared. Across the field was Jupiter, a golden eagle. I stood with my arm extended at right angles to my body and gave as loud a whistle as I could manage. Jupiter cocked his head and shifted his taloned feet. I whistled again and he was off, flying at me in a gliding arc. He came in smoothly, talons extended, and the sudden contact rocked me backward. Even through the thick welder's sleeve and double lineman's glove, I could feel the bite of his talons as he steadied himself and began to eat his meat reward.

From that moment on I was committed to the San Francisco zoo's bird of prey project which had begun in February 1971. For some time it had been obvious to staff zoologist Paul D. Maxwell and to a volunteer, Dennis Banion, that the zoo's raptorial birds were not doing well. Some had broken feathers and poor foot condition (often a problem in captive birds of prey). Few had the vital appearance that marks a prospering captive animal. So the birds in worst condition were removed from their cages and tethered by means of leather bracelets and leashes in a grassy fenced area. Jupiter, partially blind in one eye, was the first to come out, followed by a bald eagle called Charlie and two red-tailed hawks. Calling themselves Raptors Lib, Dennis and other volunteers began training the birds,

Maryrose Spivey, a 27-year-old housewife, joined the volunteers of Raptors Lib after someone stole a young wolf she was raising in her backyard.

The author winces as the talons of Orphan, a golden eagle, clamp down into her wrist.

using the ancient methods of falconry. Today the San Francisco zoo is one of the few places in the United States with a training and release program for birds of prey. So far the volunteers of Raptors Lib have returned 16 birds to the wild, mostly hawks and owls.

Golden eagles are particularly difficult and dangerous to train—mainly because of their great strength. During the Middle Ages when the sport of falconry flourished, only kings were allowed to fly them, but even the kings usually passed them by, preferring the easier handling of falcons. Today, as an endangered species, the golden eagle is even more circumscribed. No one may own a golden eagle, and zoological gardens are allowed to keep them only by permit from the U.S. Fish and Wildlife Service. There are only 50 pairs of bald eagles and 150 of golden eagles in California, according to the state's Fish and Game Department.

I joined the program some nine months after its inception and my first task was to learn how to handle and care for Jupiter, a bird that has broken in a number of volunteers at the zoo since then. During the summer of 1971, we were given two young golden eagles in the hope that we could act as substitute parents, teach them to hunt and fly and then reintroduce them into the wild.

They were both males, only a few months old. We called them Orphan and Geronimo. Orphan was picked up from a nest, after his parents had been shot, and brought to us by the Fish and Wildlife Service. Geronimo had been stolen from his nest, apparently by someone who wanted him as a pet or who wanted to train and hunt him. In any event, Geronimo had subsequently got loose and was found wandering around San Francisco. The local ASPCA brought him to us. Although it is strictly illegal to shoot or capture golden eagles, as well as other endangered species of birds of prey, the fates of Orphan and Geronimo are, unfortunately, not uncommon.

Moody, stubborn and unafraid

First, both young birds had to become accustomed to their human foster parents. Both were young enough that they quickly became unafraid and learned to fly to our gloved fists for their food. As we do with all our birds, we tried to insure that their nutrition would be of the highest quality, feeding them baby chicks and small rodents as well as freshly cut meat laced with vitamins and minerals.

Geronimo was as friendly with humans as a golden eagle ever gets. He liked to have his head scratched and was very slow to show aggressive behavior. Orphan was another matter. The most beautiful eagle any of us had ever seen, he was completely fearless and very aggressive with his trainers. When you started to pick

Charlie, a bald eagle, is now a graduate of hunting lessons in an exercise field behind the zoo.

him up, he would raise his crest and fly at you with talons extended.

After two months' work, Orphan and Geronimo were firmly conditioned to fly to us for food. The next task was to help the two eagles learn to hunt and kill their own food. This task fell to a mountain-climber and teacher of yoga, Larry Caughlan, a photographer, Nat Zabarsky, and me. First we constructed a fake rabbit out of rabbit fur and compacted soft filler. We used this lure to start teaching the two young eagles how to use their feet to grasp and kill their rodent prey.

Both eagles were often moody and stubborn. Larry and I would carefully garnish the lure with meat, weigh Geronimo to make sure he was neither too fat nor too thin to fly, and carry him out to the field behind the zoo. After all this preparation he would stand on a stump and gaze meditatively at his feet for 45 minutes. On a cold, damp April morning this can be exasperating and often led Nat to exhort him passionately not to act like a turkey vulture.

Orphan always appeared eager, but would sometimes fly off into the distant trees, ignoring our "rabbit." Also he was very possessive of the territory around his perch and of the rabbit lure once he did go after it. Tempting Orphan off the lure by holding out fresh meat and having him fly at me with talons at the ready and gleeful murder in his eyes is an experience I will never forget.

In addition to training Orphan and Geronimo, we all cared for other birds in the project—Charlie the bald eagle, a great horned owl and a vulturelike crested caracara from Mexico—and each of us continued to fly Jupiter. I was also hand-feeding a male eagle handicapped by an infected wing. He had lost too much weight, and we had to move him away from his mate, a female with only one eye. He would not eat, so every day I caught him, wrapped him in a blanket to protect both of us from injury and eased chunks of food into his mouth. This had to be done seven days a week for a period of three weeks before he was strong enough to go back to the female. Neither of them can ever go free, but we hope to take advantage of their obvious attachment for one another to begin a breeding program making use of crippled birds which will have to stay in captivity.

By April 1972, both young eagles were flying well to

the lure. I would hold Orphan at one end of the field while 15 yards away Larry would begin running as fast as he could, dragging the lure well behind him. Orphan learned to glide across the top of the grass and intercept the "game" no matter how fast we ran. He would land with a loud, aggressive chirrup and immediately mantle, spreading his wings to hide his "kill." The crest feathers on the back of his head would go up, a signal that he didn't mean to give it up. Getting him off the lure so we could repeat the whole process was sometimes quite harrowing.

Now we began to "enter" the eagles to live game. This was decidedly an unpleasant task for all of us. None of us are hunters and Larry, in fact, is a vegetarian, but it was vital that Orphan and Geronimo have this experience before they were released and had to rely on themselves alone.

A wild golden eagle dives on its prey, landing and gripping hard with powerful talons. Death for the prey is almost instantaneous. Because of their youthful inexperience, however, Orphan and Geronimo were clumsy and slow at first. Orphan never lacked aggression but he lacked know-how. Geronimo was actually afraid of live rabbits. We didn't know whether to laugh or cry as one morning we watched a rabbit chase him in circles.

As their schooling progressed, we began taking both birds for varied hunting and flying exercises to ranches miles from San Francisco, where sympathetic ranchers let us use their property. By late spring we felt we had taught the eagles as much as we could. We began to think about a place for their release—a spot as far as possible from human habitation, and yet a place where there was someone to monitor them. We began what was nearly a three-month search for a suitable site. We would drive as far as 300 miles to some isolated part of California only to find that the rodent population had

Tethered with a leash, Orphan plunges down the hill of a private ranch after a live white rabbit.

A bit clumsy in early attempts, the eagle permits the terrified rabbit to escape—at least temporarily.

recently been poisoned or there was a rural development too close.

Finally in late June we found Joe and Lois Smith, an exceptional couple who had spent their last two summers manning a fire tower on a private ranch high in the San Bonito Mountains. Game was plentiful on this isolated ranch, the owner was willing to let us release the birds, and the Smiths were enthusiastic. We had found our release site.

We have been especially careful to keep the exact spot a secret. In spite of reliable evidence to the contrary, some people still believe eagles carry away everything from lambs to ten-year-old children. Our headquarters at the zoo is rapidly filling up with birds which have been shot and permanently grounded. In all, we now have 25 birds in the program, which is still operated wholly by volunteers using their own funds. Raptors Lib is currently seeking funding to support at least two full-time trainers who could provide needed continuity to the program.

For the release of the two golden eagles we decided to use a method falconers call "hacking out." Our only

Having finally made the kill, Orphan raises his crest and mantles, shielding the dead rabbit with his wings.

experience in releasing birds up until then had been with one hawk. We built special hacking perches at which the birds would be tethered and fed for two weeks while they became accustomed to the site. After their release, the Smiths would continue to put out food in case either eagle needed help to get him through the first critical period of freedom.

The two weeks passed and early on a Friday morning in July we once again made the 75-mile trip to the fire tower. It was an extremely hot and dusty day, but we told ourselves it was perfect for soaring above the mountains. Larry and I banded both eagles, wrapping each bird in a blanket and holding his feet securely while the band was clamped on. After the banding, Larry lifted Geronimo to his arm and carried him to a bluff overlooking the mountain. We slit Geronimo's leather bracelets and he stood for a moment on Larry's arm. With an exultant cry of "Be free, Geronimo!" Larry cast him into the air with a powerful swing of his arm. The eagle immediately soared off and we watched until he was nothing more than a black dot high above the mountains.

Then it was my turn. I urged Orphan into the air and he took quickly and eagerly to flight. Both eagles were now aloft and free. We spent the rest of that day and the next watching through binoculars, once in a while catching sight of them as they dipped and soared in the clear, clean mountain air.

Since we released the two eagles at the fire tower, the Smiths have faithfully kept watch over them. They have seen Geronimo come back to the hack board for food periodically: We know now that the hacking method works, that the birds will come back if they become hungry. Orphan has never even once come back to eat. He flies over the tower now and then in the company of two other immature eagles and is obviously doing splendidly.

After months of training, Orphan leaves the author's gloved arm the last time and returns to the wild.

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By J. Bronowski

The heavens were brought down to earth by Copernicus the humanist

Amid the bustling ferment of Renaissance thought, this modest, committed man brought a human perspective to astronomy

The facts of Copernicus' life may seem modest (SMITHSONIAN, March 1973) and his character obscure to us. But we know that Copernicus the astronomer was also a humanist gentleman and I want first to transmit the broad and even romantic sense of humanism in that description. I want to begin with the tang and taste of the age, its almost physical sense of bursting from the monastery back to nature, which is so vivid in the Renaissance.

Movements that claim to go back to natural ways of thinking usually turn out to have a bias against science, and humanism was no exception. The father and fountainhead of the movement, Petrarch in the 14th century, had such an antipathy toward scientific techniques that he even disliked medical men. Nevertheless, one of Petrarch's good friends, Giovanni de' Dondi, was a doctor, and a fine mechanic into the bargain; he was nicknamed dell'Orologio because he spent 16 years, during a busy medical and university practice, in making a beautiful astronomical clock at Padua. The original clock is lost, but it has been possible from the drawings to make a copy which is now in the Smithsonian Institution in Washington (see page 42).

It is a mechanical model of Ptolemy's system, with seven faces on which the seven planets of antiquity (Mars, Jupiter, Saturn, the Moon, Mercury, Venus and the Sun) run on geared sets of wheels that trace out their epicycles. We do not know when the clock was lost; it may be that Leonardo da Vinci saw it, since there is a drawing of his that looks very like the mechanism designed to carry Venus.

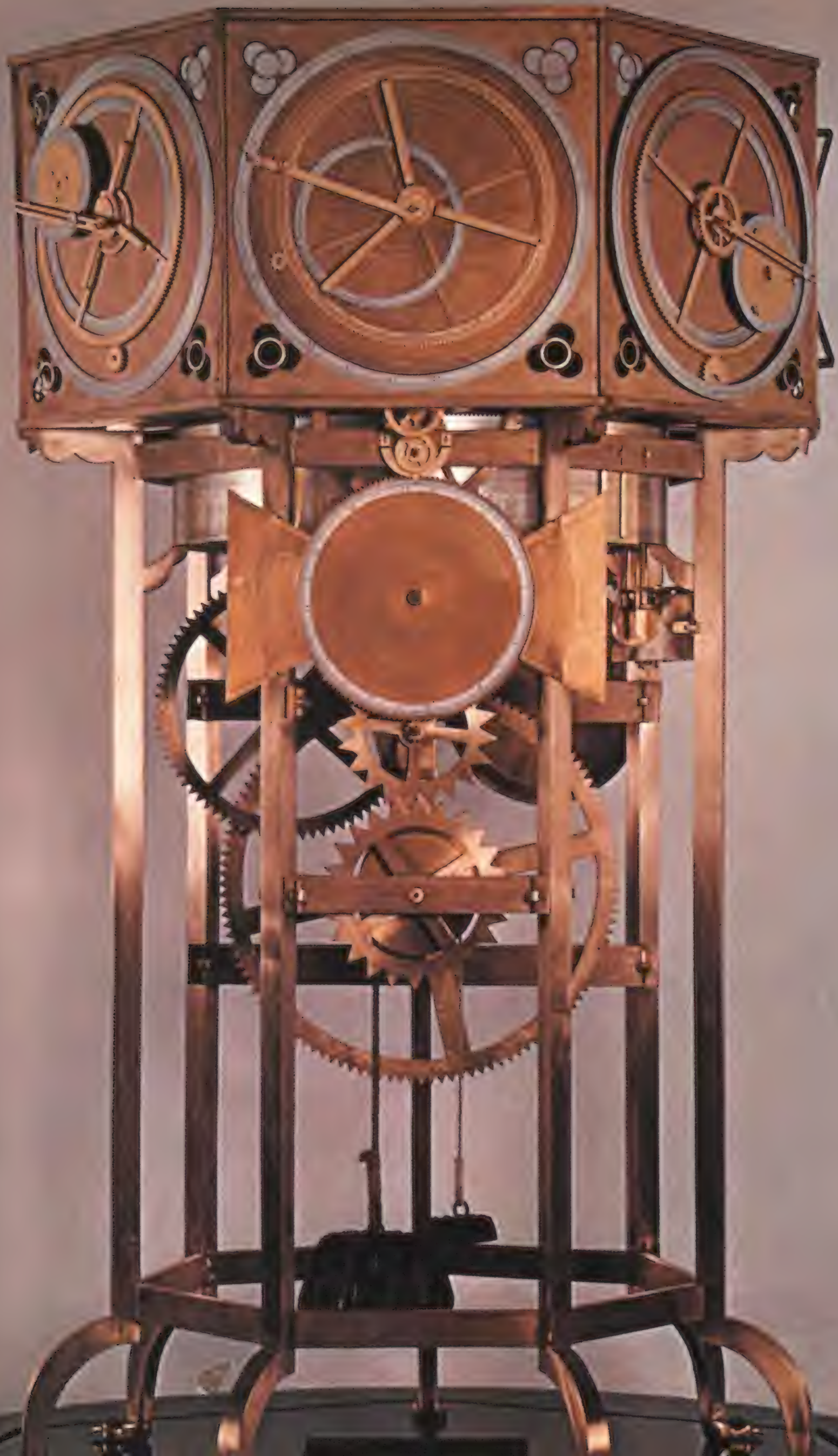
I linger on de' Dondi's clock because I want to bring home the age's sense that the starry heavens are a work of art, and a divine inspiration for the poet and the scientist alike. Petrarch could not be expected to find that in the classical authors that he admired and reintroduced: They were Latin, and came from a culture that had little head or taste for science. But a hundred years later, the movement of humanism to the Greek classics recovered a culture with a different outlook, in which science in general and astronomy in particular had been highly regarded. Humanism in the 15th century was preoccupied with Greek as a language and with Greek ideas.

Copernicus was not at the hub of humanism in Krakow—an eastern frontier town at the edge of Europe, as we are still reminded by the trumpeter who blows the hours from the Cathedral tower to commemorate a Tartar raid. One of his objectives in going to Italy was certainly to learn Greek, and probably to learn Greek in a scientific context; it had just been introduced, for example, at the medical school in Padua. Indeed, it has been suggested, and supported by astronomical evidence, that Copernicus had already convinced himself that the earth moves around the sun, and that he went to Italy to learn Greek specifically to find sources in Greek thought—in Aristarchus of Samos, for example, and in Pythagoras.

At this point it is right to ask: But was not Greek

Jacob Bronowski, a Pole by birth and a distinguished scholar now at California's Salk Institute, will host the forthcoming BBC television series, "The Ascent of Man." This article is based on a lecture to be delivered April 24 at the Smithsonian (see p. 84).

A radiant, stylized portrait of the astronomer is the motif for a Polish poster, one of many on display in that country (see pages 48-49) as it celebrates Copernicus' 500th anniversary.



science known in Europe before the Renaissance, before Petrarch even? Surely Ptolemy was known, surely Euclid and Galen were known. And surely already by 1270 Thomas Aquinas had turned Aristotle into a household oracle and a Christian.

Indeed, that is so; the books of these men were read and revered in Europe, having been translated first into Arabic and thence into Latin during the Moorish occupation of Spain. But that roundabout and narrow channel had produced a tradition dominated by one Greek thinker, Aristotle, in all fields of science. A central thrust in humanism is the revolt against Aristotle, and this is true whether we interpret humanism broadly as I am doing, as a thirst for the whole wealth of knowledge, or strictly as an academic program of reform in education. For example, when the founder of the new alchemy, Paracelsus, showed his contempt for medical dogmatism by publicly burning a standard textbook in Basel in 1527, he chose the *Canon of Medicine* by Avicenna, an Arab follower of Aristotle.

Since what we would call the scientific establishment based itself on Aristotle, the up-and-coming young men avid for new ideas naturally turned to Plato. The masterly translation of Plato was begun by Marsilio Ficino in the 1460s and finally published in 1484; he had trained himself for it on the instructions of Cosimo de' Medici, who had made Florence a home for Platonists. These events had two effects on the development of science and its conjunction with humanism—one direct and one indirect.

The direct effect was to make science more mathematical, since Plato was much concerned with geometrical notions. Aristotle's insight had been into differences of quality; he was a naturalist by temperament, a lover of taxonomic systems, and that was the mood of science and medicine before 1500. In contrast, Platonism brought in a more quantitive manner, in which general principles were expected to satisfy specific tests, so that the detail of nature became significant for scientists as well as artists.

The new temper is evident in the work of Leonardo da Vinci, who wanted his drawings of a machine or a flower not only to look right but to work right. Aristotle has no sense of mathematics as a dynamic description; for example, he thinks of an eclipse of the moon as an inherent property of the moon, not as an effect of its motion. The idea that the world is in movement that can be pictured mathematically had to come from the Platonists. Later, when Galileo in his *Dialogue on the Great World Systems* explained the Copernican system, he repeatedly stressed his debt to Plato.

The faces of Giovanni de' Dondi's 14th-century clock traced the epicycles of Ptolemy's seven planets. This replica stands in the Smithsonian Institution.

The indirect effect of the Florentine school of Platonism is more subtle and harder to trace, though I think it no less important. There is an underlying sense of mystery in Plato, and even in the Greek fascination with mathematical relations. It was therefore foreseeable that the new Platonism in Florence and elsewhere leaned to mysticism and in time became obsessed by it. When Cosimo de' Medici's buyers came back to Florence from Macedonia with a manuscript of the fabled Hermetic texts, which were supposed to be pre-Christian prophecies by an Egyptian magus called Hermes Trismegistos, he had Ficino put Plato aside and translate them first. Their influence was immense, for they gave to nature a numinous quality, a sacred but vibrant life, which fitted the breathless adventure of the Renaissance. They are quoted in this sense by Copernicus in a well-known passage in *De revolutionibus orbium coelestium:*

> In the center of all rests the Sun. For who would place this lamp of a very beautiful temple in another or better place than this, wherefrom it can illuminate everything at the same time? As a matter of fact, not unhappily do some call it lantern; others, the mind, and still others, the pilot of the world. Trismegistus calls it a visible God.

However, we must not let this single passage lure us to believe that Copernicus drew much on the Hermetic texts or on Ficino's own rapturous essays on the sun; he did not. But there is no doubt that the appeal of Copernicus' system was heightened by an enthusiasm for the astrological power of the sun that came from the Hermetic texts. The fact is that until 1600 humanists knew Ficino better than Copernicus, and were quick to recognize his touch. For instance, when Giordano Bruno lectured on Copernicus in Oxford in 1583, his hearers ignored the science but were sharp to spot the quotations from Ficino.

Mysticism and science

The mystical fantasies in neo-Platonism seem to us now merely superstitious, and to obscure the science as they did for Bruno's audience at Oxford. But this is too simple a view. The neo-Platonists were fascinated by the relations between nature and Man, and they were too sophisticated to think that they could be controlled by the primitive and beastly magic that was current in the Middle Ages. They looked for more subtle influences in nature, such as the influence of the planets; and since those could not be browbeaten or

Copernicus knew the huge wooden triptych in Krakow's St. Mary's Church, carved by a German, Veit Stoss. It is a spectacular example of the new perspective of space in religious art, a style later banned when the Church grew alarmed over secularization.

controlled by Man, they wanted to understand nature so that they might fit their actions to the propitious moments that she presented.

In this way, they moved away from the medieval concept of black or Satanic magic, which seeks to force nature out of her course, to a new concept of white or natural magic which is content to exploit her laws by understanding them. I believe that this change in the means by which the mind hopes to master nature was an important influence of humanism on science which took place in Copernicus' lifetime.

Humanism in any sense is by origin an academic movement, because the sources at which it seeks its new knowledge are classical texts. But it would be unrealistic to ignore the strength that it drew from its popular appeal. Erasmus and Martin Luther were contemporaries of Copernicus, and showed before he published his book that the attack on authority needs a public that has the means to judge for itself—needs the printed book above all. Petrarch in the 14th century could find a poetic following in manuscript, but the sweep of humanism a hundred years later needed the backing of print; for lack of that, Leonardo da Vinci was forgotten much as William Blake was later. A list of the books printed in 1543, the same year as Copernicus' *De revolutionibus,* is fascinating: It includes the anatomical drawings of Andreas Vesalius, the first Latin translation of the mathematical works of Archimedes, and the attack on Aristotle's logic by Petrus Ramus which did so much to change methods of reasoning and of education.

A new picture of the world was forming in the public mind—a new geography that made Ptolemy old-fashioned, and a new cosmology that made him seem literal, formalist and unimaginative. What spread the new picture through Europe as if it had wings was the printed word; for example, Galileo's *Dialogue* in 1632 was sold out before the Inquisition had time to seize the copies.

But there was also a popular element in the formation and the nature of Copernicus' picture which has been neglected and which I want to stress. Consider what Martin Luther said about it before the book ever got into print. Here, he said in his *Table Talk,* is a "new astronomer who wants to prove that the Earth goes round, and not the heavens, the Sun and the Moon; just as if someone sitting in a moving wagon or

The Krakow triptych comes alive in the detailed portraits of everyday citizens that were carved on the reverse side of the outer panels. This realism, the desire to capture a particular moment

ship were to suppose that he was at rest, and that the Earth and the trees were moving past him."

Luther was an earthy man, by no means an intellectual, and his earthy comparison was also made by others. Yet think how surprising it is in an age when the laws of motion were unknown, and dynamics was not understood. The principle that the motions Luther describes are equivalent is usually called Galilean relativity; Luther is speaking 25 years before Galileo was born. How had it come about that Copernicus could place his mind's eye at the sun and see the earth from it, and that much less mathematical minds could grasp what he was doing and see it as he did?

The question seems far-fetched today, because we have lived with perspective drawing for 500 years, and therefore find it easy to shift our viewpoint in imagination. But that was not so when Copernicus grew up. Perspective was a new art then that had been cultivated by the *Perspectivi* in Italy early in the century. Albrecht Dürer, who was a contemporary of Copernicus, had to travel to Italy to learn "the secret art of perspective." Copernicus himself was fortunate in seeing perspective at first hand as a popular art in the huge carved and colored wooden triptych in St. Mary's Church in Krakow which Veit Stoss finished about 1489 (see pages 44-45).

Such simple and almost primitive church pictures had changed the perception of space in the 15th century. Before that, sacred pictures were flat and static because they represented a god's eye view. Perspective is a different conception, mobile and human, a moment in time that the artist has caught with a glance from where his eye happens to stand. This sense of the temporal and human pervades the picture: In the Krakow triptych it comes alive in the portraits of city worthies, the everyday people who stand around the holy figures. After the coming of Luther, the Church of Rome grew alarmed at this secularization of the heavens and at the Council of Trent expressly forbade it in sacred paintings. It is an element in Copernicus' view of nature, for although he is usually accused of removing Man from the center of the universe, in fact he moved him into the heavens. His system abolished the distinction between the terrestial sphere and the crystal spheres beyond the moon, and made the heavens earthy.

The humanism that I have traced in Copernicus' outlook was a broad and, at the last, even a popular mode of thought. There was also, however, a narrower and specific form of humanism directed to a reform of the curriculum. In this sense, humanism was pursued in the particular study of grammar, rhetoric, poetry, history and normal philosophy. In time it mounted a formidable attack on the syllogistic logic of Aristotle. But it failed to find an alternative in science to Aristotle's mode of reasoning from the general to the particular until it inspired Francis Bacon.

Nevertheless, academic humanism established results in one of its disciplines which had a far-reaching effect on science and on society together. It came in the most unlikely way from the study of Latin and Greek, which stimulated in literary scholars a feeling for exactness as passionate as that which the new-found mathematics stimulated in scientists. As a result, they learned to analyze old texts precisely enough to date them. Their discovery that this could be done, and how to do it, has a right to be ranked as a scientific discipline, a kind of literary archaeology. And like the

in time, in contrast to the traditionally flat, static, sacred art, secularized the heavens and indirectly paved the way for the new perspectives of science in the Renaissance.

more usual archaeology, it uncovered fakes: For example, it enabled Isaac Casaubon in 1614 to prove that the Hermetic texts had been forged in Christian times.

But a far more upsetting discovery had been made before that in the 15th century. It was made by the pioneer of the method, Lorenzo Valla, an early humanist who scandalized his contemporaries by his epicurean and irreverent ways. In 1439 he electrified the Christian world by proving that a number of revered church documents had been forged, probably in Rome in the eighth century. The most important of them was the Donation of Constantine, by which that emperor, who died in the year 337, was supposed to have granted the Popes temporal dominion in and beyond Rome. We have perhaps grown cynical now about the shuffling of treaties, and do not expect states to be scrupulous in their quest for power. But in 1439 it was catastrophic to learn that the spiritual head of the Church was sustained by fabricated documents.

The moment was a watershed for intellectual leadership in Europe, because it identified scholarship with exact truth. That had not been the character of academic disputation in the established tradition of scholasticism, nor was it prominent in the Aristotelian way of doing science. Of course, Aristotelian and Thomist science offered explanations for natural phenomena, but these explanations were not expected to have the precision of detail and sharpness of fit that Valla's literary archaeology had shown to be possible and definitive. It was not self-evident and not a foregone conclusion that the lesson would be picked up by scientists, and singled out so that it became a crucial part of their method.

There is a case for saying this was the most profound influence of humanistic scholarship on science.

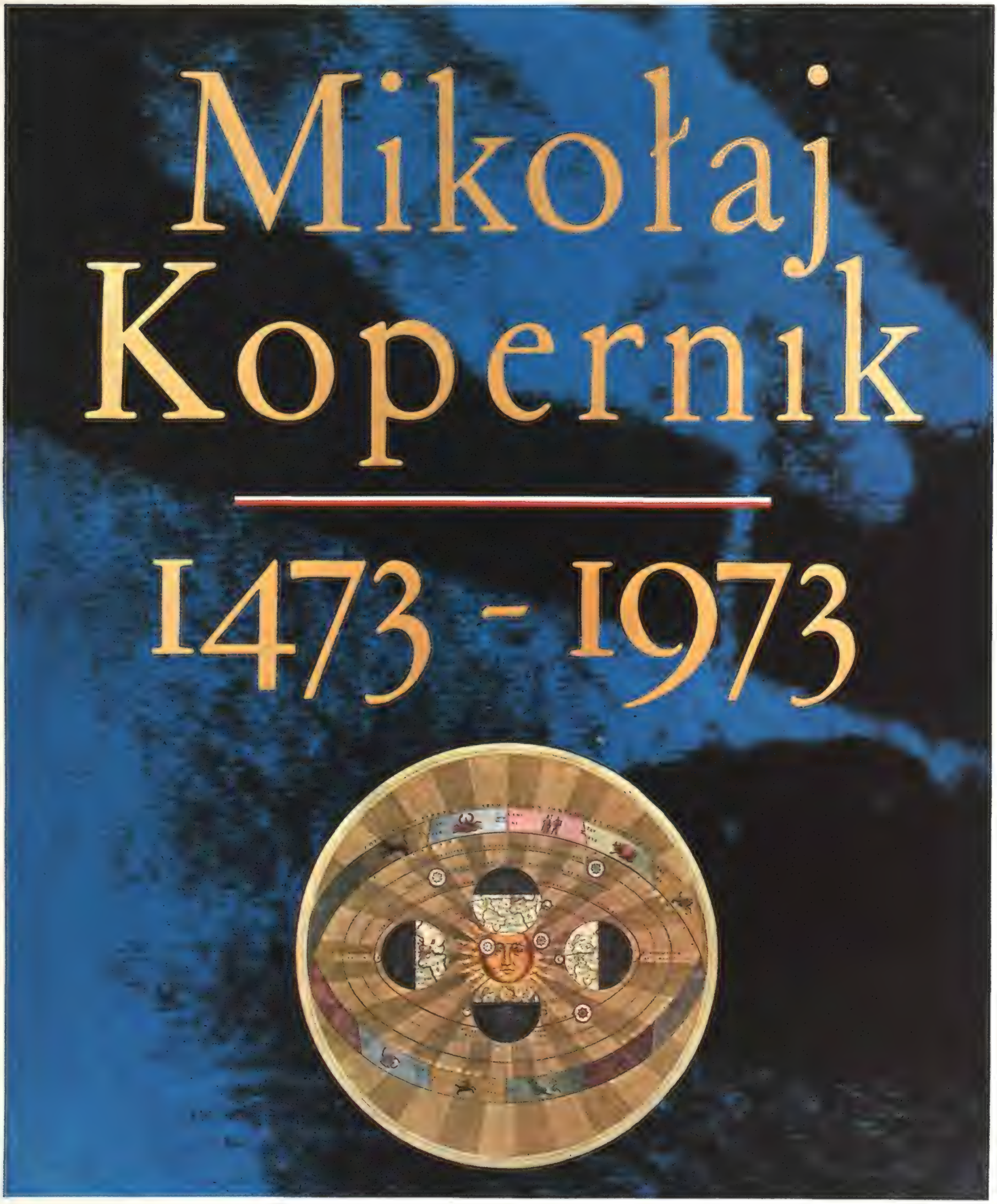
The preoccupation with the exact detail of truth created a different ethic for science: In the long run, it shifted the pursuit of science from results to methods, and the personality of the scientist from a finder to a seeker—characteristically, we now call his work *research.* In this way science becomes an activity which demands for its collective success that all those who practice it share and adhere to certain values. As a particular case, the critical need for the detail of truth has forced the scientific community to insist that ends must not govern means: There are no supreme ends—only decent and honest, namely truthful, means.

Had the Church drawn the same lesson from the scandal of the Donation of Constantine, there might have been no reason for it to part company from science. Instead, Valla was long persecuted, and 150 years later Cardinal Bellarmine still castigated him as *praecursor Lutheri,* a man who opened the way for Luther. By then the Copernican world system had been made a religious issue; Bellarmine had a finger in the trial of Bruno and in the first proceedings against Galileo, and science in Italy was doomed.

Copernicus was a silent man, but a committed one. He believed that his world system was true, and no ground of expediency persuaded him to say less. More is at stake here than belief in any one truth: Copernicus' attitude implies that truth exists in nature absolutely, and cannot be established or overturned by any authority other than the study of nature herself. In this simple and rational faith, Copernicus was a humanist pioneer who created his science from a base of philosophy as Isaac Newton did in a later age, and Albert Einstein in ours.

The tribute to Copernicus

Two posters, of almost a hundred commissioned from Polish artists by the Copernicus Society of America, announce Poland's year-long celebration of the 500th anniversary of the birth of the nation's greatest hero. These and many others, plus instruments used by Copernicus, will be displayed this month at the Smithsonian during a symposium on the nature of scientific discovery.



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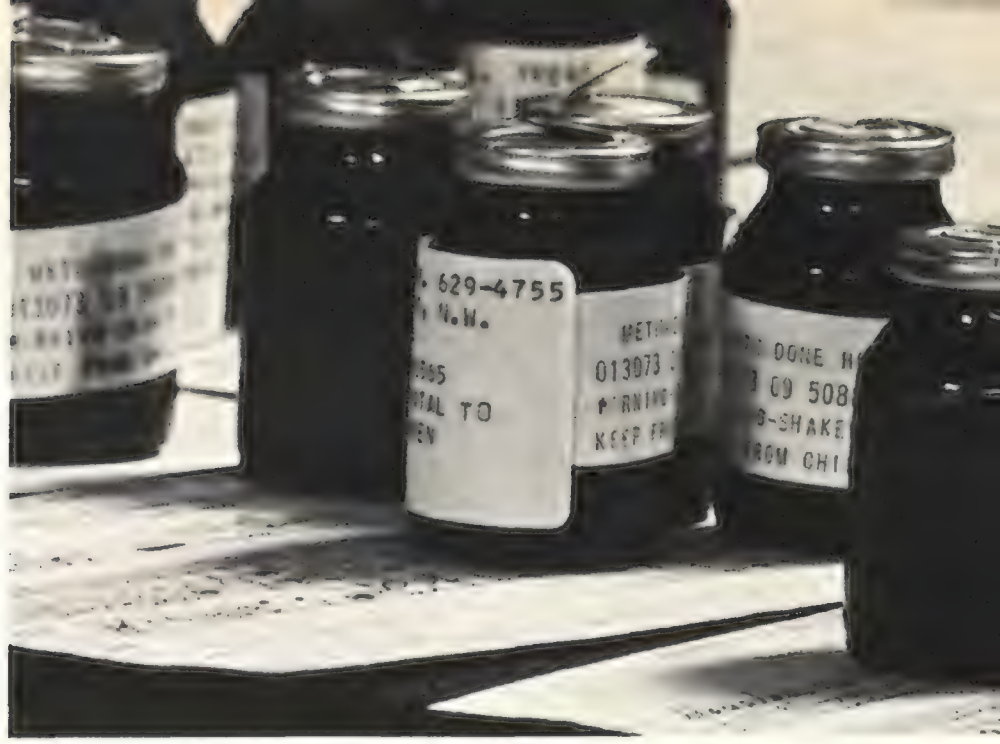
By Amitai Etzioni

Methadone: best hope for now



The methadone

Unlike other programs for heroin addicts, methadone works. It should be used more widely till a better solution is found

What do we mean when we say, "Let's solve a social problem?" On the face of it, the answer is rather obvious: Make the problem go away, cure the ill, enrich the poor, cleanse the environment. But in the intricate, multifaceted, conflict-laced reality of society, problems are rarely solved in the sense of being made to vanish. Usually they are only reduced, defined as no longer problematic or "handled" in some other less than complete manner. This is true not only of our society but also of most others. One reason why most societies do so poorly is precisely because they believe they can do so much.

In reality, we are hampered by limited know-how (for example, no one has yet designed an effective education system to help a large number of people to catch up); lack of resources (it would take at least one-and-a-half times our gross national product to handle the popular list of our ten most urgent problems); and a lack of consensus, both of what we want and how to proceed (do we jail all marijuana dealers or legalize its use?). Thus, sadly but inevitably, we must limit ourselves to incomplete solutions. These, one must hope, in accumulation, over time, will lead to more encompassing and fundamental cures.

It is like looking back at the beginning of the industrial era, when children were forced to work long hours in the mines, under terrible working conditions. Should those efforts that were initially limited to getting kids out of the pits be sneered at as trivial and useless? Yes; if the goal is to redo mankind, such achievements are barely notable. But if the perspective is that each human life saved or enriched is worth a day's work, keeping in mind that tomorrow we must do more, then each reform is quite welcome.

Only when you stop investing most of your time trying to build the "perfect" light bulb, one which will waste none of its energy by generating heat instead of light, will you find great value in the difference between a 4.5 percent light-yielding bulb and a 5.5 percent one.

Methadone is a good example of useful, incomplete, social problem-solving by means of what can be thought of as "technology." It is a treatment in which a technological approach replaces the "human touch." Methadone is not necessarily a *good* treatment, but nevertheless, for the time being, it is the best available.

First of all, and most important, methadone "works." Only those who have tried scores of other approaches, ones which yield no improvement or serve to deepen the problem, can fully appreciate the sweet sound of this little word. The fact is that various punitive-custodial programs, half a dozen education-informational ones, and rehabilitation-psychotherapeutic drives have all had very little positive effect on heroin addiction.

How well does methadone work? While practically all heroin addicts released from prisons return to the street to shoot and push heroin, while an overwhelming majority seem immune to psychotherapy and while most shrug off educational efforts, roughly 80 percent of those who have voluntarily joined several major methadone maintenance programs encompassing thousands of addicts stay with them.

Like all other incomplete solutions, methadone has hyperenthusiastic advocates. It has been occasionally claimed that methadone "blocks" heroin; that a person who is on methadone and shoots heroin will gain

Continued on page 52

By Henry L. Lennard, Leon J. Epstein and Mitchell S. Rosenthal

The cure becomes a new problem

controversy

Social problems require human, not chemical, solutions. The substitution of one drug for another is an idea that backfired before

Methadone is a synthetic opiate drug similar to heroin and it is rapidly becoming the treatment of choice for heroin addiction. Ironically, it may also soon challenge heroin as the number one "drug problem."

The White House Special Action Office for Drug Abuse Prevention describes methadone as an "important rehabilitative tool" and methadone is currently being dispensed to 85,000 addicts in 450 programs throughout the United States. Federal agencies last year awarded the City of San Francisco alone $2.5 million so that the methadone program there could be expanded more than threefold.

With each passing day these programs are being encouraged and expanded (often at the expense of other alternatives), and more and more persons are becoming dependent upon methadone and upon those who furnish it. Indeed, methadone has already achieved the status of a black market drug sought for by addicts and sold by pushers. The number of methadone overdose deaths has been rising rapidly, approaching those caused by heroin, in certain major cities such as Washington, Buffalo and Minneapolis.

The methadone maintenance procedure was introduced eight years ago by two physicians, Vincent Dole and Marie Nyswander of New York, who administered it to a small, selected group of addicts with whom the rehabilitation techniques of incarceration and psychotherapy had failed. They found that it was possible to induce many addicts to substitute the oral intake of the synthetic opiate methadone for the intravenous intake of heroin.

Dole and Nyswander believed that heroin addiction led to permanent and irreversible physiological changes in the body, causing an addict to develop a lifelong "hunger" for opiates. From their experience, they concluded that the substitution of a legal and supposedly "better" opiate was the only feasible solution to the rapidly growing dilemma of heroin addiction.

But on what grounds should methadone be considered a "better" drug than heroin? One reason offered is that methadone is legal, a "medicine" prescribed by physicians, while heroin is illegal, a "drug" purveyed by criminals. However, this is an accident of circumstances having little to do with different properties of the drugs. Heroin itself, when first developed at the turn of the century, was hailed by some physicians as a desirable substitute for morphine in the treatment of morphine addiction.

Another point stressed by advocates of methadone programs is that heroin produces euphoria and methadone does not. Furthermore, they maintain that within a certain range of dosages, methadone produces cross-tolerance (or a "blockade effect," as Dole terms it), so that a person who has taken methadone is unable to experience any euphoria from a subsequent use of heroin.

In fact, methadone and heroin are very similar drugs. When either is taken orally, the effect is gradual and the body adapts slowly to the increasing blood concentrations. When either drug is injected intravenously, the effect is more sudden and subjectively dramatic: The body's adaptive mechanisms are briefly overwhelmed, producing the "rush" or euphoria. Thus it is the route of administration—not the particular drug—which results in diminished euphoria. Once tolerance to either of these drugs has developed, neither tends to produce euphoria, although injection of

Continued on page 54

no euphoric effect, no "high." As far as I know, this quality of methadone has not been demonstrated. Actually, one percent of participants in the methadone programs studied are reported to use heroin regularly, and a larger number try it occasionally. Nevertheless, methadone's success in getting people off heroin in these programs is very high.

Some have argued that this success is futile because methadone is itself an addictive drug and the net effect can be compared to shifting an alcoholic from Scotch to bourbon. But there is no evidence of *serious* side effects from taking methadone (in prescribed dosages) over long periods of time.

As to crime reduction, while 91 percent of those involved in the programs referred to had been jailed prior to their participation in the methadone maintenance programs, and practically all had been involved in criminal activities more or less continuously, 88 percent of the participants now show arrest-free records. Only 5.6 percent have been found guilty of criminal offenses. A report by the director of the District of Columbia narcotics treatment division shows that as the number of addicts on methadone increased, the level of drug-related crimes fell almost proportionally. Thus, with about 20 percent of the addicts in such treatment, drug-related crimes in Washington, D.C., fell from 12,432 in 1969 to 11,222 in 1971.

The reasons are persuasive. Heroin involves a person in a life of crime, a deviant subculture and a desperate hunt for money to support a very expensive habit. A methadone program requires much less frequent intake for the addict, no hunt for funds and a much more stable psychic condition. While it does seem to have a mild tranquilizing effect, especially when higher dosages are used, it does not impair work, study or other social functioning.

In a group of 990 methadone-takers examined, those employed or attending school rose from 27 percent at admission to the methadone program to 65 percent after one year in the program, to 77 percent after two years and to 92 percent in the third year. This is an almost unparalleled success rate for any social effort that I know of.

The longer, more stable "high" that methadone is reported to provide seems to be caused, in part, by the different way it is administered. It is ingested, while heroin is injected. Both are rather similar products, but they are not identical. Part of the difference might well be attributed to the fact that heroin is an organic substance while methadone is synthetic. (I keep qualifying my statements—not to meet academic niceties

As part of the system of controls, an addict is photographed at a Washington methadone clinic.

which insist that "nothing is ever really known," but because often, when we must make such decisions, a good part of what we need to know, we don't, and what one authority claims to be quite true, others question most seriously.)

Second, the fact that methadone is usually ingested, while heroin is normally injected, is not accidental. In the programs discussed, methadone is provided in clinical conditions, in the street culture heroin is taken in the quest of a quick high. Methadone programs can bring former heroin addicts in touch with people anxious to help them to overcome their condition, such as doctors and social workers. Heroin addicts deal with pushers anxious to feed their habit.

All these many virtues of methadone do not make it more than an incomplete, and hopefully transitional, solution. It also has several serious problems. It *is* itself addictive. People are *maintained* on methadone but, as a rule, are not weaned from it, because withdrawal from methadone seems to be about as difficult as withdrawal from heroin.

It does not follow, though, that we should forget about the use of drugs to curb drugs. Let us develop a better drug, one which would allow weaning. Indeed, such efforts are presently under way; nonaddictive heroin substitutes—cyclazocine and nalaxone—are already being tried. Meanwhile we use methadone.

Many of the startling good results cited above were achieved when methadone was made available under carefully controlled conditions. Recently, as it became more widely disbursed, the amount of abuses reported have been increasing. There is now a black market in methadone, partly a result of the fact that authorities in many parts of the country are still unwilling to provide it to all heroin addicts who wish to use it. Moreover, there has been a significant number of fatalities as a result of overdose—in a few cases as a result of hospital errors, in most because of abuse of methadone on the street. But similar problems appear whenever a program shifts from selective to mass use. When intrauterine devices were tried in a high-quality New York hospital birth-control effort, there were many fewer infections than when they were used in a mass program in India.

What is required in the case of methadone is: (a) For the time being, provide it to *all* confirmed heroin addicts who wish to use it, other than pregnant women (babies born addicted are reported to go through a severe withdrawal crisis); (b) keep tight control of supplies and dispensation systems to curb a black market which may make it available to nonaddicts; (c) combine the methadone maintenance with other services, from employment counseling to psychotherapy; (d) above all, search for better solutions.

Like a five-percent-effective light bulb, how one views methadone is a question of perspective, *what one compares it to.* To other methods available? It is vastly superior. In terms of human suffering that is alleviated —both for addicts and victims of crime—it is more than welcome. As an ultimate solution to the problem of heroin addiction, however, or as compared to methods we may have one day, even within the next five years, it is far, very far, indeed, from being perfect, ideal, or even acceptable.

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either may still provide a fleeting shadow of the original effect.

As for the "blockade" effect of methadone, this phenomenon is produced by administering high daily doses of the drug (many times the amount once recommended for the alleviation of the pain of cancer). With such a high dosage, the body is probably not affected by smaller, additional amounts of heroin. A sufficiently massive dose of heroin, however, will still override this "blockade."

It should also be noted that methadone does not produce cross-tolerance with nonopiate drugs, such as stimulants, barbiturates and alcohol. It has been found that precisely such drugs are used by sizable numbers of patients on methadone maintenance to achieve the euphoria otherwise denied to them.

Carl Chambers of the New York State Narcotic Addiction Control Commission and Russell Taylor of Philadelphia General Hospital studied 40 patients on methadone maintenance and found that 82.5 percent of the patients had used at least one other drug (detected by urinalysis); 77.4 percent of the total group had used heroin concurrently with methadone; 30 percent had used barbiturates; and 25 percent had used amphetamines. The median length of maintenance treatment at the time of the study was 22 months.

Here is how a recovered heroin addict who had spent some time in a methadone program put it in an interview: "You know, a guy goes on methadone, and all it changes is the type of dope he's using (because he's still got to go down and cop every day) and where you go to get your methadone. . . . You never get away from using drugs, using methadone, because you never get away from drug addicts."

The advocates of methadone use often claim that there are virtually no side effects from the drug, that users are merely "normalized," much as diabetics are normalized by insulin. From the evidence available, this does not seem to be the case. Many observers report that persons maintained on methadone are somnolent, tire more easily and require more sleep than nondrugged individuals.

Reflexes of persons taking methadone are somewhat abnormal. They perspire more profusely and are often constipated. Sexual impotence often occurs, especially in older men, although this fact has received little public attention.

Let those who maintain that addicts lead "normal" lives on methadone ponder the restrictions placed on their freedom of social movement and activities which methadone "treatment" imposes. Just as the heroin addict needs to stay close to his source of supply, so the methadone maintenance patient is restricted in his social movement.

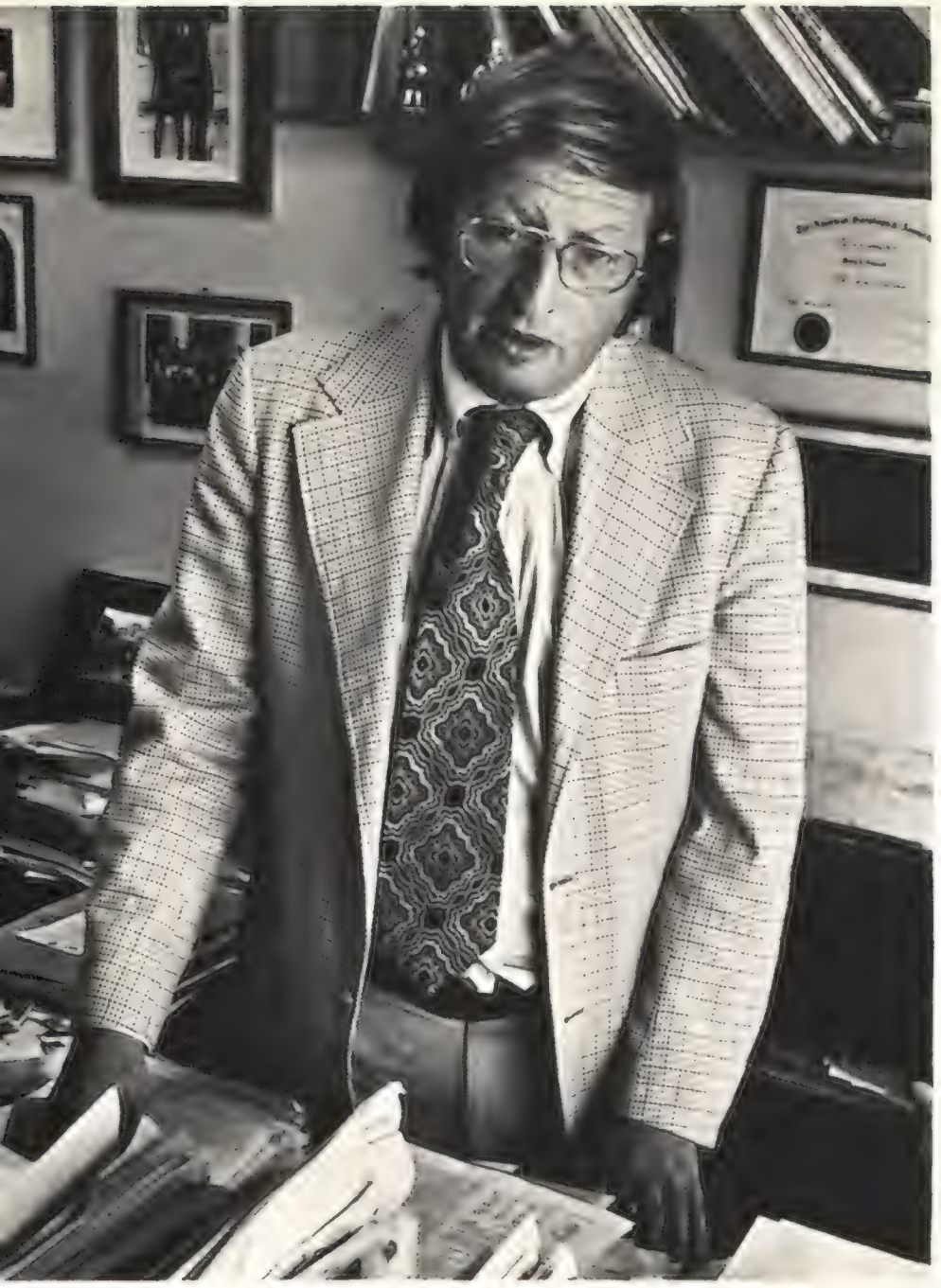
It is axiomatic that all drugs involve risks at some dosage levels, in some people, under some circumstances. The question is: How much risk is acceptable for *whose* benefit and *who* should decide?

There is no doubt that methadone can be useful in the short run for the purpose of enabling some addicts to withdraw themselves from heroin. In the case of individuals who have been addicted many years, the availability of methadone as a substitute may relieve the addict of forced criminal associations and the threat of a long prison sentence.

Such judicious use of methadone, however, should not be misrepresented as a treatment or a solution to the drug problem; methadone should not continue to be administered to large groups of persons as if it were a panacea. It is essential that high priority be assigned to research on drug effects (including social and interactional effects) and on the consequences of adopting the methadone "solution."

In order to understand the considerable appeal this methadone solution has for officials, the medical profession and the public, we must be aware of the background of heroin use and the factors surrounding the increase in its use.

The "heroin problem" has various roots. One lies in the unjust social arrangements that have inflicted suffering on certain segments of the population. One reaction to the excessive pain of social and economic deprivation has been the ingestion of chemical agents which, as they anesthetize the individual against pain, may also provide him briefly with considerable pleasure. The majority of addicts in New York City are blacks and Puerto Ricans. James Baldwin is said to have observed that what kept Harlem quiet for many years was the combination of "Jesus and Junk." Alcohol serves similar functions for large numbers of per-



Dr. Lennard (above) is the director of the Family Study Station of the University of California in San Francisco. Dr. Epstein is a psychiatrist at the same university and Dr. Rosenthal directs New York's Phoenix House Programs. Their article grew out of a scientific paper in *Science* magazine.

sons low on the social ladder who have limited access to social and economic resources and to other sources of pleasure.

The promotion, application and use of chemical agents constitutes another set of determinants for the so-called heroin problem. Consider that we live in a country where in 1970 more than 225 million prescriptions for tranquilizers, sedatives and energizers were written by physicians; where the virtues of drugs in providing instant relief from all sorts of trouble, real or imaginary, are extolled incessantly in advertisements carried in the mass media; where the Pied Pipers of the youth culture announce astonishing revelations from the use of a variety of drugs; and where promises of spectacular scientific "breakthroughs" in drug application are touted daily in both popular and serious publications.

Is it not therefore ironic that society turns for advice and counsel on the solution of the "heroin problem" to the medical profession—the very groups and persons who already advocate drug use?

It is important to remember that some members of the medical profession advocated the use of opium as a treatment for chronic alcoholism, and helped introduce heroin as a weapon against morphine addiction with the same enthusiasm with which methadone is now advocated. Many thoughtful spokesmen of the medical profession, mindful of these earlier failures, urge caution and restraint in the adoption of quick solutions and in the medicalization of social problems, but they are not being heard by those responsible for formulating public policy.

The social costs of the methadone "cure"

Drug use, whether legal or illegal, exacts a range of costs, both visible and invisible, short- and long-range, interpersonal and social. The decision to use any drug, therefore, especially a potent one, must involve a consideration of such costs. As with the ecological disasters that now beset our physical environment, the consequences of drug use may not become apparent until irreversible damage has occurred. And even as the machinery for dispensing the methadone is presently being established under government auspices on a massive nationwide scale, some proponents of this policy have already lost their enthusiasm and have begun to seek new chemical antagonists which will "immunize" persons against drug addiction.

Do we have here yet another chemical solution to the problems created by a chemical solution of a social problem?

Drug action is not specific, a fact especially true concerning the action of psychoactive drugs. As with any potent drug, the effect of methadone is not only in the physiological realm, but also in the complex of psychological and social processes connecting the individual to his physical and human environment.

Drugs, furthermore, not only affect the person taking them, but all persons in close contact with him: his children, spouse and parents. Methadone administration, especially methadone maintenance, forces those who share the social life of the addict to continue a relationship with an individual who uses a potent narcotic. The addict's family and associates thus have to live with all of the limitations in responsiveness, alertness and potential for feeling that the drug imposes on the addict.

Worse, the decision to use methadone on a large scale supports and reinforces for the community at large a drug-oriented approach to the solution of social and personal problems. As methadone becomes accept-

ed across the nation as the least costly and most efficient treatment for addicts, it tends to replace other kinds of treatment.

The advocates of methadone often derogate the work of therapeutic communities such as Phoenix House or Daytop in New York City. When some successes of such programs are grudgingly admitted, the admission is often accompanied with the criticism that the rehabilitated addict has developed a dependency on the program.

It is difficult to understand how advocates of methadone maintenance can be critical of programs in which persons become dependent upon human environments instead of drugs. Why should they prefer that persons become dependent upon chemical agents, such as methadone, rather than upon supportive human contacts? Such a preference shows a lack of appreciation of the very factors that initially propel individuals into taking drugs.

It is an obvious fact that few, if any, persons are ever "on their own," that we are all dependent on people, that we are sustained and shaped through the support of our family, friends, co-workers and the social networks and associations in which we are embedded. In the case of addicts, such social arrangements have often been deficient and incomplete. They have not had sufficient opportunities to depend upon other human beings.

The "heroin problem" is, as we have said, the tip of the iceberg. The use of psychoactive drugs tends to atrophy the internal self-regulatory capabilities of human groups. If the problems in a social system are dampened by drugs, then the human skills a group needs to employ to meet the distress or deviance of its members are not exercised. The problems become medicalized, the approach technological, and their roots remain masked and are not attended to. This presently is the case in medicating children who have behavioral problems, the elderly in nursing homes, mentally disturbed people, unruly prisoners and now drug addicts.

Laymen, policy makers and professionals alike need to exercise great restraint to keep from being swept along in the movement to redefine social and personal problems and differences as medical disease—whether the problem be drug addiction among the poor and ethnic minorities or the unhappiness and distress of the elderly. Wherever possible we need to speak out

At a Phoenix House in New York, addicts carry on a typically noisy group therapy session.

for human answers, not technological ones. We should recognize that problems which have diverse roots in social, economic and human conditions require the development of social, economic and human strategies for their solutions.

The Phoenix House Program in New York City is the nation's largest therapeutic community system for drug-free treatment and rehabilitation of former heroin addicts and abusers of other drugs. In one study of the results of this program, the percentage of arrests was examined for a sample of 254 addicts who did not complete the program (dropouts) and 104 who were in the last stages of the program. Addicts with any residential experience in Phoenix, even those who failed to complete the program, showed sharp reductions in criminal activity during and after leaving the program. The longer the residence, the greater reduction there was in the number of arrests. The lessons from this kind of evidence seem clear.

Any model for the treatment and rehabilitation of drug addicts must take into consideration how difficult it is for persons already on the drug route to "make it" in an addicting and drug-pushing society, especially when they are limited by the many social and economic constraints forced upon them. Clearly, no program can succeed unless it is followed by new social arrangements, devised to provide human associations and territorial supports for the drug-free addict. Such programs, though initially expensive, will be far less costly to the community in the long run.

In the final analysis, the false model is always the more costly one.

By Rice Odell

Patent models recall creativity of early America

Required by law, thousands of gadgets supported inventors' hopes for everything from an elevator brake to a clothespin

For 80 years after the beginning of the Republic, America's prolific inventors were required to submit small models of the brainstorms they wished to patent. Altogether, it is estimated that 300,000—and perhaps many more—such models arrived at the U.S. Patent Office. But there have been three fires, a series of auctions and other attrition.

Possibly 150,000 of these models—from corsets to locomotives—still exist in various parts of the country. Some might say they comprise an enormous collection of toys. But, more accurately, they represent an astonishing record of man's inventive wizardry. "They are important historically as a record of American and foreign technological accomplishment," says Robert M. Vogel, curator of the Smithsonian Institution's Division of Mechanical and Civil Engineering.

The government now retains only about 3,000 of the models. A small number are lodged in the Patent Office, including an Edison light bulb in the Commissioner's chambers. The rest are at the Smithsonian —some on display in its various museums and in the Associates' dining hall, but most secluded in its reference collections. The Smithsonian hopes—and believes —that it has most of the choice models that still exist.

Don't dodge the threatening cowcatcher—it's a toy locomotive modified to include a new refinement—a sanding device, not visible in the picture.

But it is possible that the whereabouts of many important miniatures is unknown.

The models not only represent a great historical legacy of ideas. "There's an incredible range in craftsmanship," says Vogel, "from the utterly crude model whittled by the inventor himself with a penknife, to the highly professional." A truss bridge, for example, was put together informally with scraps of tin and sticks. But a cannon on a swivel includes exquisite brass gears and other moving parts.

Over the years various rules have governed construction of the kind of models that could be submitted. In general, a model was to "exhibit advantageously" the attributes of an invention. By 1873 the Patent Office's rules had evolved to require that a model be "neatly and substantially made of durable material, metal being deemed preferable; and should not in any case be more than one foot in length, width or height . . . . Glue must not be used."

A working model was generally preferred. In some cases, the "model" consisted of the invention itself, if it was small enough. A model did not have to demonstrate the whole machine, only that feature involved in the claim. But most models included all working parts, or at least a full mock-up of the machine.

Certainly, many of the more expert models were made by the inventors themselves. But those not at home with hardware could seek out the many skilled artisans available a century ago and so much more difficult to find today—machinists, cabinetmakers, blacksmiths, founders, watchmakers and the like.

Skilled modelers available

Alternatively, the inventor could turn to a special breed, the "model maker." He could walk in with nothing more than a rough sketch, and generally count on the model maker's fine machinists to transform it into an operating reality. In the words of one advertisement in 1858, "We are prepared to manufacture every description of working models, of all kinds of material."

Model makers began sprouting up near the Patent Office in Washington, D. C., for example, and by the 1870s there were about a dozen of them in the city. Then, when models were required only if the Patent Office thought it necessary, these multiskilled entrepreneurs began to disappear. By 1929, according to a city directory of Washington, only one remained: D. Ballauf Mfg. Co.

The firm was started by Daniel Ballauf in 1855, and

Rice Odell has written articles for SMITHSONIAN *on the controversies over a new dam (September 1971) and new freeways (April 1972).*

Old-time patent models

Built of tin, this crude model of a variation of the famed Otis elevator was made to display its Safety Air Cushion at the bottom of the shaft, an improvement for which a patent was sought.

it is situated today at the same location in the heart of Washington's Chinatown. As the model-making business shrank, D. Ballauf turned to its own specialized machine-tool work. But, up to several years ago, it still accepted almost any challenge brought in from the street. Even without the Patent Office requirement, inventors frequently had models made for court evidence in a patent dispute, or to help them sell their invention to a financial backer.

With so much riding on their patent applications, it is not surprising that most inventors struggled over their drawings and models, insisting on a high degree of professionalism. "Some of them would almost live in here while their models were being made," said Thomas E. Hayes, president of D. Ballauf.

Golden hope on every model

If the craftsmanship of the models was usually impressive, so must have been the anxiety and hope they embodied. One can only imagine the hard work, the time and money, and the aspirations that went into the development of a rifle, a fire engine, a windmill, a venetian blind, a candle mold, an ice-cream freezer, a machine for cutting cork, for making barrels, for cleaning tobacco leaves and for draining marshes.

How many hopes were dashed, or just melted forlornly into the years? Many models were forwarded to the Patent Office without names, to be lost or mislaid. Even when properly labeled, many disappeared into oblivion, having been put helter-skelter into boxes or onto shelves as patent examiners frantically tried to keep pace with a growing deluge of models.

In addition, patents were issued promiscuously for years, with no regard to other inventions in the field. This led to competing claims. Inventors also had the benefit of studying the models of others—for they were on display, and were viewed with awe by the public and by foreign visitors. At one time an estimated 200,000 models were clogging every corner of the Patent Office. In 1936, it was reported to a Senate committee that "it is not uncommon for persons to copy patented machines in the model room; and, having made some slight, immaterial alterations, they apply in the next room for patents." With no real examination system yet in effect, patents were routinely issued and inventors sallied forth to market them. Whether original or stolen, of course, an invention seldom reached fruition as a commercial product. Many a scoundrel, however, was able to brandish his patent papers and induce eager investors to part with their money. And patent lawyers, too, sometimes gouged their inventive clients.

The various American colonies had procedures for granting patents as early as the 17th century. Then, at

the instigation of James Madison and Charles Pinckney in 1787, the U. S. Constitution gave Congress the power "to Promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." The period of exclusivity was 14 years, later extended to 17.

A patent law was passed by the first Congress in 1790. It created a three-man patent board headed by Secretary of State Thomas Jefferson, an accomplished inventor himself. The law also required the submission of a model with a patent application, if feasible. Obviously, models could facilitate evaluation of an invention. It was often easier for an inventor to build a model than to draw and describe his device.

In 1790 only three patents were issued. But over the years applications and models proliferated, more than once causing the Patent Office to bulge at the seams and retreat to a larger building. In 1810 it moved from an office in the State Department to Blodgett's Hotel, where hundreds of the miniatures were displayed. In the summer of 1814, after British forces had burned every other federal building in Washington, they prepared to put the torch to Blodgett's as well. Dr. William Thornton, the dynamic chief of the Patent Office at the time, rushed into the city from his Georgetown home and pleaded with the British colonel not to destroy a collection so valuable to mankind (see SMITHSONIAN, April 1971). The British spared it.

Fire destroys a collection

But fire was soon to strike with a vengeance in any case. By 1836, the number of models had grown to 7,000, and some had to be relegated to the hotel's attic. That year Congress passed a law to provide a new building, and ground was broken. But on December 15, flames destroyed Blodgett's and the model collection was wiped out. (Among the countless valuable items lost were Robert Fulton's original drawings of his steam engine.) Congress appropriated funds to restore the most significant models, but the task proved difficult and was only partially completed.

Models kept pouring in, however, and it wasn't long before they were filling up display rooms in the new Patent Office building (which now houses the Smithsonian's National Portrait Gallery and National Collection of Fine Arts). Patent Commissioner Henry L. Ellsworth was rather annoyed at the logistical problems. But he was also impressed, and in 1844 he issued what must rank as one of the great overstatements of all time: "The advancement of the arts . . . taxes our credulity and seems to presage the arrival of that period when human improvement must end."

It was, in fact, only the dawn of a golden age of in-

One of thousands of iceboxes, this features a new system of cooling ducts and chambers.

Two fanciful clothespins date from the mid-19th century; one bears an etched face, the other a sliding lock. The inventor of the latter, one T. L. Goble, carved his name on one of the movable arms.

venting. Spurred by the challenges of the Civil War and the needs of a pioneering, postwar people, the nation's inventors seem to have applied themselves with more gusto than ever. The roster of brilliant conceptions to emerge in the last half of the 19th century and the first few years of the 20th would seem to be unparalleled: revolver, machine gun, air brake, barbed wire, telephone, phonograph, incandescent lamp, railroad car couplings, electric welding, electric motor, refining of aluminum, linotype machine, zipper, trolley car, cash register and airplane, to name a few.

By 1877, some 175,000 or more models were crowded into the exhibition rooms of the Patent Office, where they were accumulating at the rate of more than 13,000 a year. Unfortunately, it was once again a fire which alleviated the glut. On September 24, 1877, two wings of the Patent Office were burned out—and posterity lost an estimated 76,000 of the models.

By this time, in any case, the flow of models was being stemmed. With laws passed in 1870 and 1880, Congress resolved that enough was enough, and that the submission of models could be costly and wasn't crucial to most patent applications anyway. In 1870 it eliminated the requirement, except in cases where deemed necessary, and in 1880 models were forbidden unless specifically called for.

Under current law, a model can still be required. But in an age of such complexity—nuclear physics, computers, lasers, and so on—models seem anachronistic. Who, for example, would wish to model this patented color television process: "The stimulation to emissivity of red, blue and green-emitting phospors in rotation responsive to picture signals . . . etc."?

Current Patent Office policy does insist, however, that a working model accompany any application for a perpetual motion machine. There was a time when inventions which defied the laws of nature were taken most seriously by quite a few inventors. Indeed, the Patent Office itself actually granted patents to more than one such brain child. In 1909, Isaac Smyth of Chicago submitted elaborate drawings and descriptions (records do not show if a model was included)

The patentable feature of this sewing machine is its design—semidraped females holding the spool, mermaid guiding needle through serpent-shaped foot.

Wood-planer model, patented in 1861, rests on its traveling bed. Black wooden wheel represents cast iron in the production machine.

of an automobile using weights and pulleys to propel itself by the force of gravity. About the same time, someone patented a ship to be driven solely by the force of the water against its bow.

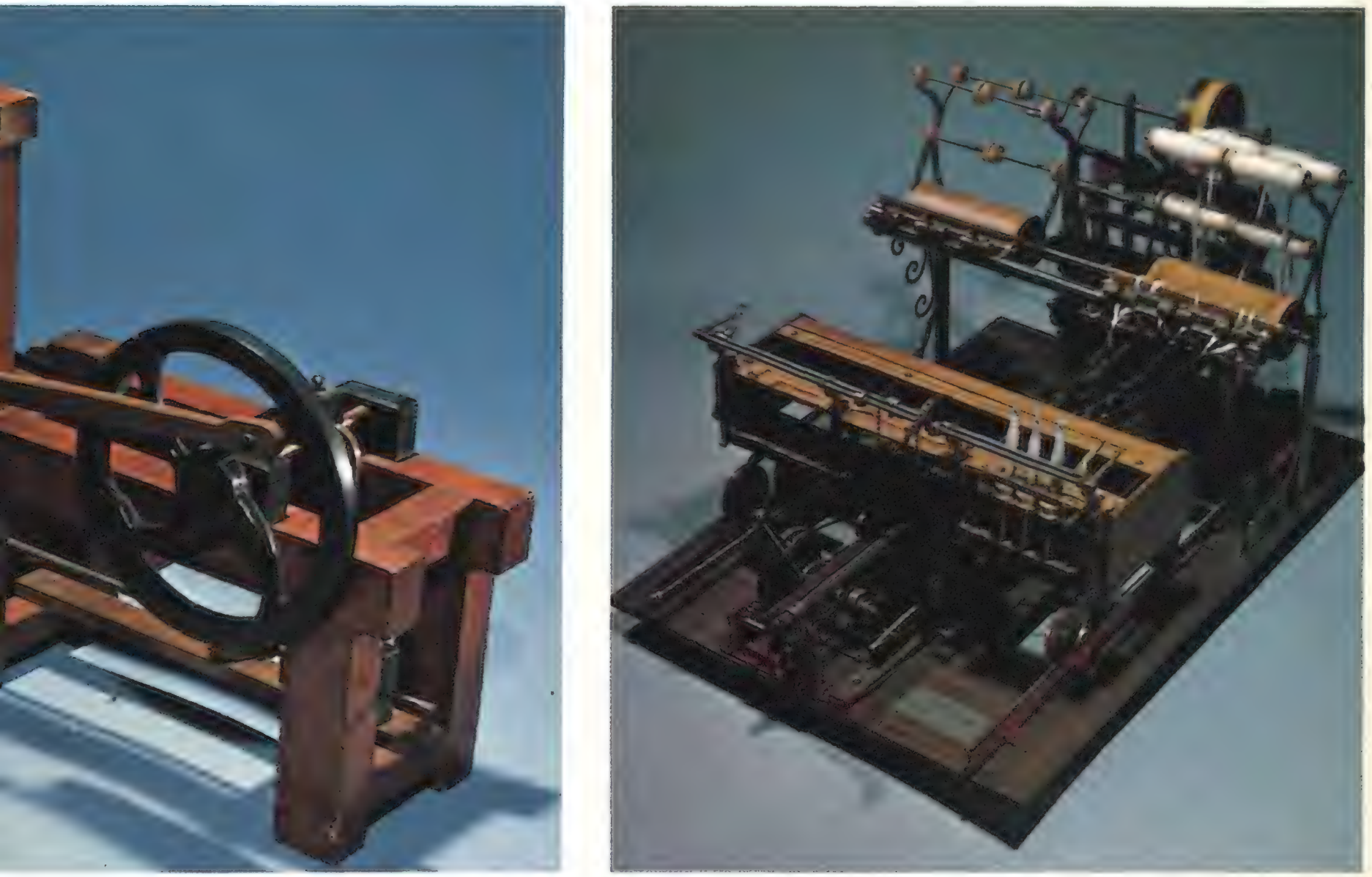
Whatever the reason, patents were granted between 1870 and 1915 for a device to create dimples; for a cuspidor that flushes; for a fly-catching pistol (with a metal jaw to spring out at the end of a long spring and snap shut on the fly) ; for an antisnoring mouthpiece (with valves to control the volume of air from the lungs) ; a hat which could tip automatically (for the man passing a lady while his arms are filled with packages); a coffin with a periscope (so friends and relatives could peer in at the face of the deceased) ; a coffin with a string to an alarm bell above ground (in case of premature burial) ; a burglar alarm to release a shower of water over the pillow on a bed (for those with defective hearing) ; a rocking chair hooked up to a butter churn; and a covered bathtub on rockers (thus combining two favorite pastimes of the day) .

In 1904, when Henry Ford's motor cars were coming into their own, Henry Hayes of Detroit applied for and received a patent on a wooden horse attached to wheels, to be mounted on the front of a car to prevent it from scaring real horses as it sputtered along.

In 1915, Louis Schramm jr. of Armiger, Maryland, alarmed by the activity of German submarines, produced plans for a ship that would carry large magnets in its hold and thereby "draw submarines out of their course and toward the sides of the ship." Then the submarine and its crew would be shocked by a jolt of electricity sent from the ship. Imagine the potential cost overruns! But Schramm received a patent.

And so it went. Meanwhile, models continued to accumulate. In 1893, the Patent Office was authorized to rent another nearby building so that it could display them. But the exhibit never materialized, and in 1908 Congress abruptly decided to sell off all the models.

First, the Smithsonian was given a crack at them. It selected only 1,061. About 3,000 more were sold at public auction. But more than 150,000 remained unsold. These were hauled around in trucks and stored



Intricate model of a self-acting spinning mule introduced a number of improvements. This patent was granted to Nathan W. Bancroft in 1874.

in various buildings in the capital for 17 years. In 1925, Congress again ordered a sale.

The models were laid out on tables, and representatives of the Smithsonian and some other museums combed through them in a search for those of special interest. The Smithsonian staff selected several thousand. "They picked generously," says Vogel, but he adds that there was considerable urgency, and that the staff members naturally emphasized their personal fields of interest or expertise to the exclusion of other technologies. There also probably was a stress on the significant rather than the impractical and amusing.

The Smithsonian screened its hoard, sending some models to other museums and educational institutions. (Years later Vogel made a point of retrieving half a dozen of special importance.) Some models of lesser import were returned to the inventors or their families, when they could be found, and one wonders how many of these, and others returned by the Patent Office over the years, remain in attics.

On December 3, 1925, an additional 50,000 models were sold at auction—for $1,550. The buyer was not identified, but it may have been the wealthy industrialist Sir Henry Wellcome, because a few months later Wellcome bought another 125,000 or so.

Sir Henry died before he could display the models in a museum he had planned. The trustees of his estate reportedly sold them for $50,000. The buyer was the Broadway producer and collector Crosby Gaige. With a flair for public relations, Gaige managed to successfully promote the models and market many of them. He then sold out to a group of businessmen.

Their efforts, which included a cross-country cavalcade, generally fizzled out. As storage costs climbed, many of the models were offered in desperation for as little as $1 each. Then, in 1942, came a bankruptcy sale of those remaining, and they may have numbered more than 150,000. They were acquired by O. Rundle Gilbert, an auctioneer from Garrison, N.Y., and his wife.

"The bankruptcy sale was in Foley Square in New York," Gilbert recalls. "We purchased them because they were going to be bought and used for scrap metal. A group of junk dealers were weighing the boxes. And this was one of the finest collections of Americana."

The models were shipped in dozens of trucks to Garrison and crammed into Gilbert's barns. In 1945, one of the barns was consumed by fire, destroying approximately 20,000 of the models—already catalogued.

Over the years Gilbert and his wife and son Robert have held a number of auctions and other sales, most recently last December when 500 models were sold. But success generally has been limited, though two men from Texas once bought 1,000 says Gilbert, and thousands of others have been sold to individuals and to the Farmer's Museum, the National Baseball Museum and other exhibitors.

The Gilberts also have displayed models at several small museums they set up themselves. Many of them are still on view at their Patent Model Building adjacent to the Garrison Inn. Gilbert estimates that they still have 80,000 models—most not yet unpacked.

George Yost's typewriter required several models for various patentable features, this one applied for in 1885. The machine was manufactured in the 1900s.

Washing machine model, dated 1866, displays a new method of turning the agitator back and forth. Inventors Stafford and Crossman got their names on it.

By James S. Packer

Slash and burn below the border

In Central America and Mexico, devastation of forest lands and watersheds by swarms of poor, ignorant farmers has become a crisis

Imagine vast tracts of rich, undisturbed, primeval, tropical forests, teeming with wildlife and untapped natural resources. A mysterious conglomerate of jungle cats, iridescent butterflies, bright macaws, thousands of acres of rich, fertile and unsettled lands, and ancient Mayan ruins. Central America surely—that boundless, pristine paradise to the south.

Central America it is. A pristine paradise of unlimited and untapped natural resources it is not. Paradise is being slowly but surely ravaged by agricultural ignorance, overzealous loggers, and bureaucratic helplessness and indifference.

The reputed lush jungles exist in only a few places, where enough rain falls to support heavy vegetable growth, and even there soils are notoriously poor. Most of Central America is high, rugged and mountainous. In these regions there are only two seasons—wet and dry—and the dry is searing. No rain falls for six long months, streams dry up, vegetation withers, and agriculture and vegetable growth in general come to an end. This type of high and seasonally dry mountain country is sadly depleted by erosional processes. It is in this area where ignorance and indifference are causing the plunder of these nations.

The main cause, but not the only one, of much of this damage is a most unlikely looking candidate for such a destructive force, the peasant of Central America. He is a man beset with hard work, filth, disease, little food or money, and even less hope. He lives in a one- or two-room hut with as many as 10 or 12 people and survives on a highly inadequate diet made up mostly of beans, corn and rice. He may possibly earn $300 a year and, with luck, live to be about 54.

He will just barely manage to eke out a living by subsistence farming on a few impoverished acres of ground. In Guatemala, for example, fewer than one percent of all farms contain more than 40 percent of the arable land. Conversely, 76 percent of all farms occupy only nine percent of this land. In Honduras, 1.8 percent of all farms occupy about 46 percent of all farmland. This unequal balance goes further than a mere majority holding; the choice, rich valley lands make up most of the holdings of the richer owners, while the natives are left as squatters on the steep, rocky and infertile mountain slopes which are highly susceptible to erosion.

Their small "farms" cling to any available space. I have stumbled over fields in Central America that were so steep that rocks and bushes served as mandatory handholds to keep me from falling over. Fields with 45-degree slopes are common. No machinery can till these plots and not even animals are of much use.

How can these destitute people be dangerous? Professor C. A. Donis, who has had years of experience in Africa, has stated that where there are more than 25 persons per square kilometer of cultivated area, degradation of soils and vegetation occurs. In places where the slope of the ground is anything but gentle, maybe as slight as a three-percent slope, serious surface erosion sets in, silting up the valleys and destroying the soil's fertility.

Honduras, the country with the lowest population density on cultivated land, has 80 inhabitants per square kilometer; El Salvador has 148. Almost all of these people occupy steep mountain slopes.

Traditional native agriculture and the dense populations are devastating to the land. This so-called *milpa* agricultural system is, at best, a subsistence affair. It is not really a system, but a makeshift in which a farmer fights a rearguard action against time and disaster.

The details of this technique are simple. The farmer clears a small plot of ground by cutting and/or setting fire to the brush and trees; afterwards he plants and finally harvests. Steep slopes thus cleared lie pitifully exposed to the forces of erosion.

It all begins shortly before the start of the rainy season. The fires appear everywhere. I have often ob-

Milpa farm clings desperately and temporarily to a Honduran slope, destroying the forest for years.

Dr. Packer is a free-lance writer and an assistant editor with the Entomological Society of America.

Such pristine forests as this in Zamorano Valley, Honduras, are needed to protect the topsoil.

The threat: Elsewhere in same valley, fire rages out of control, deliberately set to clear land.

served, from Zamorano Valley in Honduras, five or six fires burning on the surrounding mountains, their smoke forming a smoggish pall in the valley. At night the glowing flames seem to encompass the whole valley.

Fire by itself, of course, is not automatically "bad." We now know that some controlled fires can even be beneficial (SMITHSONIAN, May 1972). The *uncontrolled* and repeated fires of Central America, however, in combination with other types of native clearing, bare the already thin and poor soils to the erosional force of the rainy season's hammering rains.

The adult, fire-resistant pines of Central America are usually not burned directly, but they are often seared and weakened, and die later. Imagine thousands of acres in Central America denuded of all vegetation except older trees. If this happens each year, as it often does, then at the end of the life-span of the standing trees there will be no vegetation whatsoever. This constant clearing is the greatest danger facing Central American forests. The process has already occurred in many areas of Middle America, and is snowballing today with increasing populations.

After the hoes, machetes and fires have done their work, the steep slopes lie exposed, and for a few weeks all action stops. The flames cease, the birds return and the winds die down. This is a strained time, the hush before the storm. In May or June, as the first rains come, the uncovered soil is slowly and then, as the rains increase, rapidly washed away. Sixty or more inches of rain fall in highland Central America during the six-month rainy season, and the rains come often and heavily. Inch after inch, ton after ton of topsoil washes away, eroding the slopes, assuring for the future bare, featureless deserts. During the rainy season the rivers of Central America become running rivers of mud, carrying away into the nearby oceans not only the soil, but the hopes of these countries.

I have often seen the Yeguare River of Honduras, which is normally about two or three feet deep, rise as high as eight feet in a matter of hours; this may occur 10 or 15 times during the six-month rainy season. The load of silt and the surging powers of even the small streams during one of these storms is awesome. The erosional cycle thus triggered is followed by silting of channels, floods, and shortages of water due to flash runoff and lowered water table.

The drastically lowered water table of Mexico City threatens to destroy the concrete conglomerate on the

soil's back. The city creaks ominously with the sound of breaking drain pipes and water mains, the cracking of buildings, and the destruction of pavements. Mexico City is sinking into the hole she is digging for herself in her frenzied search for water.

But water is not the only resource that disappears under the onslaught of land-hungry natives. When Humboldt first visited Mexico at the beginning of the 19th century, he estimated that 50 percent of the area supported merchantable timber. Today, merchantable forests have been reduced to no more than ten percent of the land surface.

In a recent article, Dr. Duncan M. Porter of the Missouri Botanical Garden wrote of whole forests in Panama destroyed by the collective scourge of landless peasants. He described a lush tropical rain forest that in less than two years was converted into a wasteland of blackened stumps and sparse living vegetation. A graduate student pointed out to Dr. Porter a denuded hillside and said, "That's where I collected a new species of orchid in 1967."

A prominent authority on conservation in Latin America, the late William Vogt of the Conservation Foundation, once said: "Unless current trends are profoundly changed, most of Mexico will be either desert or capable only of maintaining a human population at the merest subsistence level within a hundred years."

Some areas may not even last that long.

Hugh Bennett, former head of the U.S. Soil Conservation Service, estimates that largely because of *milpa* agriculture, 50 percent of the present arable land in Mexico has been ruined, nearly ruined or severely affected for cultivation. Mexican experts guess as high as 70 percent.

Mexico recently lost 25 percent of one of its parks to occupation by invading squatters. Not too long ago Honduras lost 20,000 acres of fertile agricultural land to the same scourge. Officials lack means to control this landless wave of *milpa* farmers. "What can we do," asked one official in Panama, "shoot them?"

We cannot heap all the blame onto the shoulders of the *milpa* farmer. To his depredations are added those of ghosts from our own past—the timber barons. Not struggling only for meals here, these people operate on the principle of maximum profit on minimum investment and to hell with the environment. No government agency successfully tells them otherwise.

Sadly enough, some of these predators are our own

countrymen. Ron Kemp, an English forestry expert working in Honduras, has told me that "some of the exploiters in Central America are American and English, who should know better. The logging people are just in for all the money they can get."

Illegal sawmills ravage prime forests throughout Central America, even in national parks and forests. Mexicans damage trees at night and cut them legally when they die. (More than 60 percent of the energy needs of the Central American countries are satisfied through the use of firewood and charcoal.) Newspapers in Honduras describe "large areas of land that were once covered with forests which are today desolate wastelands." Mining interests, from the conquistadores to our own time, and cattle grazers also participate in denuding the mountain slopes of their trees.

There are yet large areas of Central America that are only slightly or not all eroded. Some people even boast of the vast acreages of unsettled lands as if they were some mighty resource for future hordes of natives. But most of those lands *must remain unsettled;* they simply cannot support people and their activities without being destroyed. As populations increase, however, more and more of these forested highlands will be subjected to shifting cultivation and the dangers of unsupervised logging.

What are the governments doing to combat these destructive forces? Most Central American countries have excellent laws for the protection of their forests, but they are regularly broken with impunity.

Governments in some cases may even encourage depredations by not cracking down on lumber interests and industry, which provide revenue and exports. A participant in a Smithsonian symposium, for example, told of a government forest reserve set up along a highway in Costa Rica. Loggers scraped the surrounding areas clean and then went to top politicians with stories of idle men and machinery. The reserve disappeared soon after.

Further contributing to political mismanagement of conservation is the favoritism shown to large landholders. Often these people *are* the government and they usually hold some positions or know someone who does. Some let their lands lie fallow, or simply use them as pastures, and very rarely live anywhere except near the larger cities. Because of their positions they receive many direct benefits, such as low rural taxes, roads and bridges to their properties, and so on. One Honduran government official openly informed me that two extension agents had been assigned to his rather large landholdings to "help his workers."

All of this is not to say that the governments are not trying at all: Some of them are. Unfortunately, they *have* to put their efforts into revenue-producing operations. Central American governments are overwhelmed with severe economic pressures, and it is a desperate struggle barely to maintain minimal social necessities such as schools, roads and water supplies. Even if they recognize conservation problems, which is not usually the case, they do not have the resources with which to fight back. They must, in addition, fight an entrenched system of political favoritism, apathy and ignorance.

There exist, of course, numerous organizations and foundations in Middle America funded by outside sources that spend millions every year to improve agriculture, with some admirable results. For example, the Mexican government and the Rockefeller Foundation jointly have had outstanding success in developing new strains of corn and wheat, and have passed the hybrids on to the rest of Central America and the world. Now a concentrated effort is under way to reach poor, small-plot farmers with the new seeds and technical advice. However, there are tens of thousands of such people in rural areas who need such assistance. In El Salvador, a farm cooperative program has shown great success in increasing the yields of thousands of poor farmers. Birth control is now openly discussed in most of these countries, especially Honduras, but it has yet to show any significant results to date.

Until the population explosion is halted, until the poor farmers are removed from the watersheds and given other arable land or other jobs, these forgotten men will collectively assure the depletion of the most important resources in their countries, the forests and the soils. And without these there can be no agriculture and no progress toward keeping that monster—hunger—from devouring Central America.

Formerly forested area near Oaxaca, Mexico, is now complete wasteland except for uppermost slopes.

'On the eighteenth of April, in Seventy-five . . .' Longfellow didn't know the half of it

'Hardly a man is now alive/ Who remembers . . .' the name of Paul Revere's horse, for one thing, or the true facts of his midnight ride

Revere, "with muffled oar," was rowed to Charlestown, but signal lanterns were hung *before* he left Boston.

There was Traveller and Man o' War and also Paul Revere's horse, but it's doubtful that Paul Revere himself knew the nag's name. He was in a hurry when he borrowed the horse on the night of April 18, 1775, for his famous midnight ride which warned the patriot Minute Men that the British were marching on Lexington and Concord. Twenty years after his historic gallop through the Massachusetts countryside, Revere could only recall that he rode "a very good horse."

In 1860, Henry Wadsworth Longfellow penned his beloved poem, *Paul Revere's Ride,* and described "a steed flying fearless and fleet," but neglected to mention its name. The poet used Revere's own account of the ride as a reference, and if Revere didn't know his horse's name, how could Longfellow know it?

Longfellow might have decided to allow the steed to remain anonymous, because in that poem he had already used and abused his poetic license until it was in danger of being revoked. Longfellow was a fine poet but a poor historian, and because of him generations of Americans have swallowed a conglomeration of falsities about the ride.

For example, the poet convinced most people that Revere, "impatient to mount and ride," waited in Charlestown for a lantern signal from the Old North Church in Boston which would indicate that the British were on their way. The truth is that Revere was still in Boston when the signal was flashed. He had requested a friend to hang the lanterns for the benefit of patriots over in Charlestown. Then, "with muffled oar," Revere was "silently rowed to the Charlestown shore" by two other friends.

When he got there, Revere learned that the Charlestown men apparently were confused by the "one, if by land, and two, if by sea" signal and had not departed for Lexington. He immediately located a horse and rode away. It should be noted that the lantern

By Richard W. O'Donnell
Drawings by Arnold Roth

signal was wrong anyway. General Joseph Warren, the patriot leader who sent Revere to Lexington, assumed that the redcoats were going to start toward Lexington by way of the Charles River. So the "two if by sea" signal was given. But the British rowed only a short distance, then made the rest of the trip on foot.

Longfellow's poem claims that Paul Revere shouted his "cry of alarm to every Middlesex village and farm." Revere himself may have deceived Longfellow on this point, for in his account he wrote that after leaving Medford (known as Mistick in those days) he "alarmed almost every house" on the way to Lexington. Among other things, Paul was a part-time poet, so it is possible that he used some of that poetic license himself.

Revere did not shout "The British are coming!" But don't blame Longfellow for this, for he never used the line in his poem. Paul did announce that "the Regulars are coming out" when he arrived in Lexington. The British Regulars, about 700 strong, had indeed come out on Boston Common before crossing the Charles and assembling in East Cambridge for their march to destroy ammunition stores. Their patrols were out that night and Paul, perforce, should have proceeded quietly.

The route he took was not the same one that the troops followed. They marched directly over a main road. Hence there was little reason for Revere to alarm the citizens along most of his route, because the British weren't coming their way at all.

Revere had made an earlier, less publicized gallop over practically the same route on Easter Sunday, April 16. In Lexington, he had informed the Minute Men of British plans to raid Concord. The three-day alert made it possible for a large share of the ammuni-

The author lives in Derry, New Hampshire, when he's not in Boston, writing articles for the Globe.

"The fate of a nation was riding that night," but the "fearless and fleet" steed went unnamed.

If Revere had raced about shouting his head off, he would have been nabbed before he got to Lexington.

Paul never "came to the bridge in Concord town." He was seized by the British—and spilled everything.

tion to be moved to Groton, a few miles away, along with a cannon that the British especially wanted.

Why, then, did Revere need to make a second ride to Lexington? Primarily, to warn two revolutionaries, Samuel Adams and John Hancock, to leave town. Had they stayed, they would have been arrested. Revere arrived at the Hancock-Clark house where the two were holed up, gave his message and sat down to a midnight snack. Then William Dawes, the ancestor of Coolidge's Vice President, Charles G. Dawes, showed up. He had made a similar ride from Boston—but almost four miles longer—and people have wondered why he has never received equal billing with Revere.

Dawes was slow. He left Boston two hours before Revere departed Charlestown and arrived in Lexington 15 minutes after him. True, Dawes was delayed by British patrols, but then, so was Revere.

After Dawes joined Revere at the Hancock-Clark house, Adams and Hancock decided that the two men should ride on to Concord with word of the British march. They set off on the Concord road and were joined by Dr. Samuel Prescott. And people complain that *he* never gets the credit he deserves for that night.

The truth is, Prescott doesn't deserve the same fame as Revere—or Dawes, for that matter. He only galloped into the act by accident. He was returning from a visit with his girl friend—"a Miss Mulliken"—in Lexington, caught up with Revere and Dawes, and asked if he could ride along. A lot of people were visiting girl friends that April night. Hancock had been sitting up with "the beautiful Dorothy Quincy" when Revere arrived, and, in fact, they were having a lovers' spat while history was erupting all around them. They kissed and made up that night, although later Dorothy maintained that "At that time I should have been very glad to have got rid of him."

When Dawes and Prescott detoured briefly from the Concord road to alert the Minute Men of Lincoln, the only patriot they found awake was one Nathaniel Baker. He was holding hands with a fair maid—and her name was Elizabeth Taylor.

Back on the Concord road, the three riders were approached by a patrol of six British officers. Dawes turned quickly, dashed back to Lexington and there reined in so abruptly that he tumbled off his horse. Prescott jumped a fence and got away to Concord to

deliver the message. Revere was captured. A pistol was placed against his head, and he was ordered to talk. With deep regret it must be revealed that the great patriot spilled everything. He gave such a detailed account of his glorious gallop that if Longfellow had only been there to take notes he might have written a more accurate poem.

At about 3 A.M., the British officers heard the sound of shooting and released Revere and four other men they had picked up, so they wouldn't be handicapped by prisoners in the event of a battle. Revere headed back to Lexington where he helped Hancock and Adams get away. The battle there did indeed break out, but not for several hours.

The exact route of Paul Revere's ride can never be duplicated again. At its very start, in City Square, Charlestown, a "Do Not Enter" sign blocks the entrance to Main Street, which Revere traveled. Subway stations, rotaries and all sorts of new twists and turns have completely altered the route and, at the end of his ride, Revere might have trouble finding the Hancock-Clark house, since it has been moved.

Revere was paid four or five shillings for his ride, having been hired by Boston patriots to do the job. He couldn't return to Boston for a year after that April night and lived in Charlestown until the British left the city in 1776.

As for that horse, it seems that Revere got it from Deacon John Larkin of Charlestown, who, in turn, borrowed it from his father, Samuel. It was a little brown mare, and it was never returned to its owner; after Revere's arrest, he was ordered to turn it over to a British officer whose mount was worn out. That was the last ever seen of the illustrious animal.

In 1925 a direct descendant of Paul Revere apparently made a donation to a Charlestown historical group to pay for the horse. But what was the animal's name? Some historians insist on Scheherazade, others on Dobbin. A distinguished historian suggested the horse be called Sparky because Longfellow referred to "the spark struck out by that steed in his flight."

Forget all these unworthy names. The official genealogy of the Larkin family includes the following: "Larkin, Samuel, born Oct. 22, 1701; died Oct. 8, 1784, aged 83; he was a chairmaker, then a fisherman, and had horses and stable. He was the owner of 'Brown Beauty,' the mare of Paul Revere's ride, made famous by Longfellow's poem. The mare was loaned at the request of Samuel's son, Deacon John Larkin, and never returned to her owner."

If you happen to be near the route traveled by Paul Revere some April 18th, or even think you are, listen closely to the spring winds in the trees. Forget the clamor of jets overhead, the cars going by. If you're alert, you'll hear Brown Beauty gallop by you in the midnight darkness.

"So through the night rode Paul Revere;
And so through the night went his cry of alarm . . .

. . . to every Middlesex village and farm—"
but what about the horse that made it all possible?

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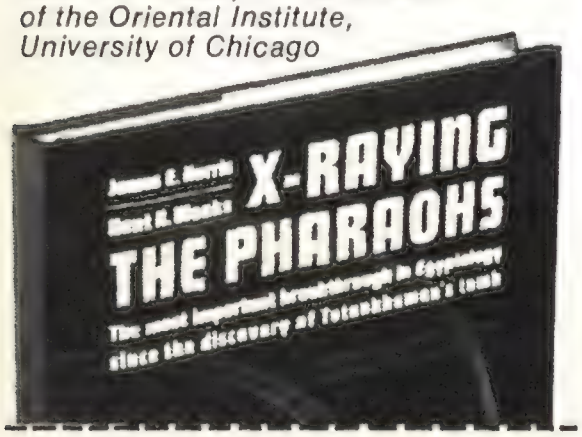
**John A. Wilson, former director of the Oriental Institute, University of Chicago*



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Book reviews

Buffalo Bill
John Burke
(Putnam, $7.95)

There is a reasonable chance that your parents or grandparents saw Buffalo Bill's Wild West Show early in this century. If you were raised in Denver, you need not be terribly old to recall being taken to the *Denver Post* and hoisted onto the knee of a white-haired old gentleman who spun fantastic tales of frontier days in a mellifluous (and bourbon-fragrant) baritone. Thus you could claim contact with the legend himself.

Buffalo Bill, along with Owen Wister's novel, *The Virginian,* and the paintings of Frederic Remington, Charles Russell and Charles Schreyvogel, helped formulate the familiar mystique of the American Wild West. John Burke's entertaining biography goes far beyond the theme of cowboys and Indians, little Annie Oakley trick-shooting from horseback and the triumph of true-hearted Western good over effete, New York-clad evil.

In 1869, William Frederick Cody was awakened from a besotted slumber beneath a wagon at Fort McPherson, Nebraska Territory, by the dean of dime-novel writers, a brilliant charlatan, also a boozer, who called himself Ned Buntline. Ned needed new twists for his books, the comic strips of their day. Cody, a bright, handsome, cavalry scout, agreed to serve as model for adventure stories beside which his own career—pretty lively, at that—paled.

Cody's subsequent life ricocheted down a garden path of adventures, some military, some amatory. Burke's charming descriptions of them reflect a real and necessary distinction between the frontier roustabout who tore apart a few saloons and blasted a few Indians with his drinking buddy, Wild Bill Hickok, and the imposing showman who looked just as regal as the kings he delighted in Europe.

Sensitively, the author indicates how the real William Cody gradually grew into the fictional Buffalo Bill until he believed he really *was* the legend. He expanded in tolerance and interest to meet the great world that had opened before the show. And what a world! Queen Victoria, entranced by the whooping Indians, the Deadwood stage, the crackle of gunfire, shaking hands with Sitting Bull, and telling Annie Oakley: "You're a very, very clever little girl"; the Indian contingent laughing in delight at the Vatican's Swiss Guard in their striped bloomers; the King of Senegal, plagued by carnivores in his country, offering Cody 100,000 francs for Annie when he saw her perform in Paris. Always, however hung over he might be, Cody managed to pose magnificently on his white charger and to blast enough glass balls (he used charges of shot in his rifle) to maintain his own image as winner of the West.

Author Burke has done a splendid job with a splendid subject. And in these pages the Wild West alters and shifts from its old, raunchy, sweat-stained, fly-swatting reality to the glossy, posturing symbolic drama that it became and that it still is.

—Edwards Park
Board of Editors, SMITHSONIAN

The Edge of an Unfamiliar World, A History of Oceanography
Susan Schlee
(Dutton, $10.95)

"Hurrah for the dredge, with its iron edge . . ." sang Edward Forbes, the brilliant British naturalist. Forbes dredged the bottoms of European seas during the 1840s in quest of exciting creatures to determine the extent of life in the depths. Just so, author Schlee has dredged libraries and archives of oceanographic institutions in search of historical details and episodes upon which to reconstruct the story of modern oceanography.

Most popularizers would have us believe that oceanography is a "new" science. Indeed, oceanography has undergone a period of faddism in the last decade during which many wondrous, "Oh,

my!" books and films have tantalized a receptive audience. The newness really occurs at the level of public and political interest, whereas the roots of modern oceanography are in fact entwined with the emergence of science in the 17th and 18th centuries.

Schlee points out that oceanography, a composite science embracing all the basic disciplines, has developed as a response to the needs of nations and people. Not that all oceanographic studies are pragmatic, but much support has derived from commercial, nationalistic and military stimuli. Even in the early to mid-1800s, the period with which Schlee embarks, the beginnings of scientific studies of the seas were prompted by the need for accurate charts of coastlines in order to minimize the annual loss of cargo into the sea from wrecked vessels.

Not a chronicle of men and machines, this book attempts to determine *why* men want to study the sea. The earlier part of the 19th century saw studies limited primarily to charting coastal zones and sampling near-shore and continental-shelf waters to assess the animal life. Gradually, by midcentury, attention moved seaward and into the great depths of the ocean. Then, in 1872, H.M.S. *Challenger* left England for a three-year voyage of scientific exploration across the world's oceans. The expedition, results of which were published in 50 volumes of scholarly reports, stimulated deep-sea research as no other had done. Modern oceanography is reckoned to have taken its first giant step with the *Challenger* expedition.

All the names of familiar men and ships fill the pages; the depth of the work and the thoroughness of Schlee's research are evidenced by the names of men and ships that will be unfamiliar to all but the most historically inclined oceanographers. The libraries and scientists of the Woods Hole oceanographic complex were her prime sources of information; that she used them well is apparent.

The book chronicles biological, geological and physical oceanography, as well as fisheries science and the accomplishments of international fisheries organizations. All of these areas are equally well defined up to about 1920. The coverage since then, particularly the period from World War II to the present, concentrates almost entirely on physical and geological oceanography. While biological oceanography has made its most significant ad-

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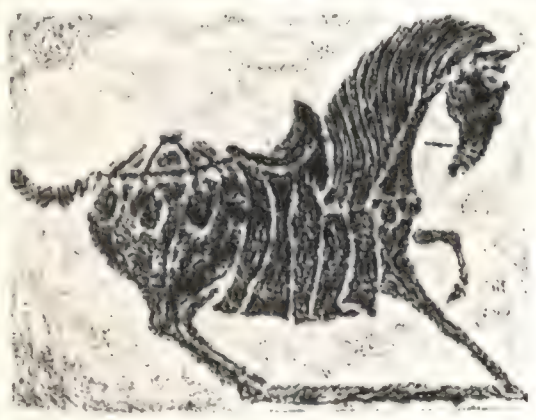

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vances in the last 30 years, the revolutionary progress in geosciences since World War II has been particularly outstanding. Biologists can in part forgive the omission with the realization that many of the long-held secrets of the history of the earth are being revealed through geophysical research. Continental drift, sea-floor spreading and plate tectonics are now accepted theories, substantiated in large part by the multi-institutional (academic, industrial, governmental) program carried out by the deep-sea-drilling ship, *Glomar Challenger.*

History can be as deadly or as lively as the author makes it. *The Edge of an Unfamiliar World* is lively.

—Clyde F. E. Roper
Department of Invertebrate Zoology
Smithsonian Institution

The Glory of the Violin
Joseph Wechsberg
(Viking, $8.95)

All great violins are at least 200 years old. And no one has created finer violins than Antonio Stradivari who died in 1737. Strange, isn't it? As Joseph Wechsberg observes, "Men have walked on the moon but are still unable exactly to reproduce the varnish of the great Cremonese [violin] makers" in northern Italy.

Having been bewitched by a three-dollar factory violin at the age of eight, Wechsberg—the lawyer, musician, journalist and onetime ship's fiddler on the old Messageries Maritimes vessels—now chronicles the romantic biography of his lifelong enchantress.

The Amati dynasty, Stradivari, Guarneri del Gesù—the magic names are all there in Wechsberg's captivating compendium of information, both practical and whimsical. He corrects misconceptions (violin strings are made from the small intestines of sheep, not cats), explodes the myth of the ancient varnish (its ingredients are no secret, their combination is), and shares his singular notions of the stuff of genius (Niccolò Paganini, Jascha Heifetz and Fritz Kreisler were all born under the sign of Aquarius).

He is most perceptive discussing the mystery of sound. Just as a violinist's tone is a natural gift rather than a reward of diligence, so it is with the art of a master violin-maker. A case in point is the sound post, a small pine rod set vertically in the cavity of the violin just under the bridge.

There is no mathematical rule for placing this sound post, which transmits vibrations from the top to the back of the instrument. Rather, the violin-maker must divine the spot with his fingertips as a water dowser uses his rod. Shifting its position a fraction of a millimeter emphatically affects the violin's tone. No wonder the French called the sound post *l'âme,* or the soul of the violin.

Those dipping into the chapter, "How to Buy a Fine Violin," may be disappointed to find few useful hints aside from the caution that experimenting with violins for more than a quarter of an hour will confuse the ear. Some readers may also tire of the many allusions to the similar natures of a violin and vintage wine. It is true that Wechsberg is a celebrated gourmet—his rhapsodic description of Sacher torte once sent me scouring through every German bakery in Manhattan's Yorkville.

One of Wechsberg's worries is that most of the great violins now lie silent under glass in museums, or in the collections of those who can afford to buy them yet cannot play them, like the Singapore banker who bought the Lady Blunt Stradivari for $201,600 at an auction at Sotheby's in June 1971. How does a violin become an objet d'art to be seen and not heard? Wechsberg pleads for the establishment of a living violin museum where great instruments can be studied and loaned out to gifted artists. [In Washington, the Library of Congress has five Stradivari instruments, the Corcoran Gallery of Art has four Stradivaris and three Amatis, and the Smithsonian has two 18th-century violins; all are played frequently.]

What one misses in *The Glory of the Violin,* and considering the astonishing range and variety of the author's material it is only a mild complaint, is any mention of the violin's importance to rural life. Nowhere do we hear about traditional folk fiddling—American or otherwise—a popular form of entertainment among people who've never heard of Heifetz and couldn't begin to pronounce Guarneri del Gesù.

—Joan Downs
Formerly a writer on music for *Life*

River of the Golden Ibis
Gloria Jahoda
(Holt, Rinehart & Winston, $10.95)

A history of an area based on one of its rivers is not a new literary device. Emil

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Ludwig and Alan Moorehead succeeded with it in their books on the Nile. Of course the Nile is a river whose very name evokes romance and exotic history. But a river called the Hillsborough? What's in a name? A great deal, apparently, for the author has rechristened this prosaically named stream, now foaming with surplus detergents, the River of the Golden Ibis.

There are two rivers in this country (both in Florida) named after onetime British Colonial Secretary Lord Hillsborough, but the subject of this book is the longer one that runs from Green Swamp to Tampa. The fascinating stories of men's activities along its banks and around the shores of Tampa Bay have here been told with great skill.

To weave stories of Spanish conquistadores, railway tycoons, banana merchants, Greek fishermen, a gaudy hotel that became a university, and the "craziest drug store in the world" into one volume that preserves any kind of unity takes some doing. But, strange to say, Gloria Jahoda has done all this.

The book is more concerned with people than places, and an astonishing array of remarkable characters are described. There is Juan Ortiz, a Spanish teen-ager captured by Indians in the 1530s and raised to be a hunter and warrior; an early 19th-century adventurer, Gregor MacGregor, who dreamed of seizing Florida with a private army; Dr. Frederick Weedon, who cut off the head of the dead Seminole chief, Osceola (after whom 17 U.S. towns were named, SMITHSONIAN, February 1973), to appropriate it as a souvenir; and Judah Benjamin, Confederate Secretary of War, who fled to Florida in disguise. There is poet Sidney Lanier, commissioned to write a guidebook to Florida by northern railroads; Dr. Frederick Weightnovel, founder of the Tampa Free Love Society; 320-pound General William Shafter, who led our army to free Cuba; and the ultra-contemporary Jim Fair, serving Tampa as "a conscience, a ham, and a 'marvelous freak.' "

One of this book's delights are the facts the author provides: Ponce de León's inglorious expedition had nothing to do with the Fountain of Youth; cigar factories hired readers to bring news, propaganda and literature to the workers while they were at their dull, repetitious tasks; the name of Key West is a corruption of Cayo Hueso (Bone Island in Spanish); and Tampa is the third largest port for bananas in this country.

The book is handsomely illustrated by the drawings of Ben F. Stahl jr. but the only map, printed on the end papers, is inadequate.

Going to Florida? Take this ideal bedside book with you. You can buy a better map in Tampa.

—Byron Farwell
History writer and author of *Queen Victoria's Little Wars.*

Mary Cassatt, Oils and Pastels
E. John Bullard
(Watson-Guptill, $17.50)

"Great Scott!" said Edgar Degas, or words to that effect, "this picture is so good it can't possibly be by a woman."

"Poor Mary," said her mother (and I paraphrase), "if she is not to marry, she may as well bury herself in her work."

The chauvinism of one's male colleagues and the disapproval of one's mother are typical of the barriers which faced any woman in the mid-19th century who wanted to become an artist. And the life of Mary Cassatt (1844-1926) is a testimonial to art historian Linda Nochlin's thesis that the reason why there have been so few great women artists is because society begrudged them the opportunity.

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Peru. An ecological impact study into the territorial behavior, scent communication, and alpine environment of the endangered vicuna high in the Peruvian Andes. (Limited openings.) See National Geographic Society Magazine, January 1973 article by chief scientist, Dr. William Franklin, Utah State University, April 22 - May 5, $990*.

ANTHROPOLOGY

Botswana. A living experience with the problems and lifestyles of the nomadic Bushmen of the Kalahari, as they struggle to adapt to a changing world. (Limited openings.) Dr. H. J. Heinz, University of Botswana, Lesotho and Swaziland. April 16 - May 4, $1290*.

Ethiopia. Witness and record the impact of an unexpected total solar eclipse on a nomadic people whose daily lives are governed by the movements of the moon and stars. Dr. Asmarom Legesse, Northwestern University. June 24 - July 10, $1390*.

Kenya. An intensive study of the animal husbandry, medicine and magic of the pastoral Pokot tribe of the Great Rift Valley of Kenya. Miss Jean Brown, University of Nairobi and ethnographer, National Museum of Kenya. July 1 - 15, $1290*.

ASTRONOMY

Mauritania. An expedition to observe and record the longest remaining total solar eclipse of the 20th century from the western Sahara Desert. Dr. Donald H. Menzel, Harvard and Smithsonian Observatories. June 15 - July 3. $1490*.

ARCHAEOLOGY

Mexico. Excavation and survey of prehistoric settlement patterns at Becan, the fortified Mayan city in the Central Yucatan Peninsula. Dr. Prentice Thomas, University of Tennessee. May 5 - June 1. $1190*.

Israel. Excavation of a Late Stone Age hunter's hut at Ein Gev near the Sea of Galilee. Dr. Ofer Bar-Yosef, Director, Laboratory of Prehistory, Institute of Archaeology, Hebrew University. August 19 - September 5. $990*.

South Africa. Survey and excavation at Makapansgat and surrounding Transvaal fossil-man caves. Dr. Phillip Tobias, University of Witwatersrand. July 8 - 21. $1265*.

MARINE ARCHAEOLOGY

Bermuda. Underwater expedition to excavate a 16th century shipwreck off the coast of Bermuda. CDR. Mendel Peterson, Curator, Division of Historic Archaeology, Smithsonian Institution. July 28 - August 11; August 12 - 26. $1290*.

Other 1973 expeditions: Geology in Ethiopia, Kenya; archaeology in Sudan, U.S.; astro-archaeology in Britain, Egypt; marine archaeology in Greece, Lebanon; marine biology in Florida, British Honduras; anthropology in India; ecology in Nepal.

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stubborn and without her independent means, would never have made it. Along with social pressures, there were practical barriers. For instance, in the days when a study of the human body was vital for academic training, women art students (under the apparent assumption that they must be protected from the naked truth of their own bodies) were barred from life classes with nude models.

E. John Bullard gives proper emphasis to Cassatt's struggle to control her own destiny in a gracefully written biographical sketch. She is a difficult person to write about, if only because she was not a bizarre or dominating personality. She was a socially correct Philadelphian who had the prescience to join up with the French Impressionists, was immensely influenced by Degas and played an otherwise minor role in a major artistic firmament.

Cassatt had the good sense to limit herself to the subjects she could do best. Her portraits of women and children posed in gardens and country houses, her young girls at their toilet and her apple-cheeked children are superb. No American ever painted mothers and children better.

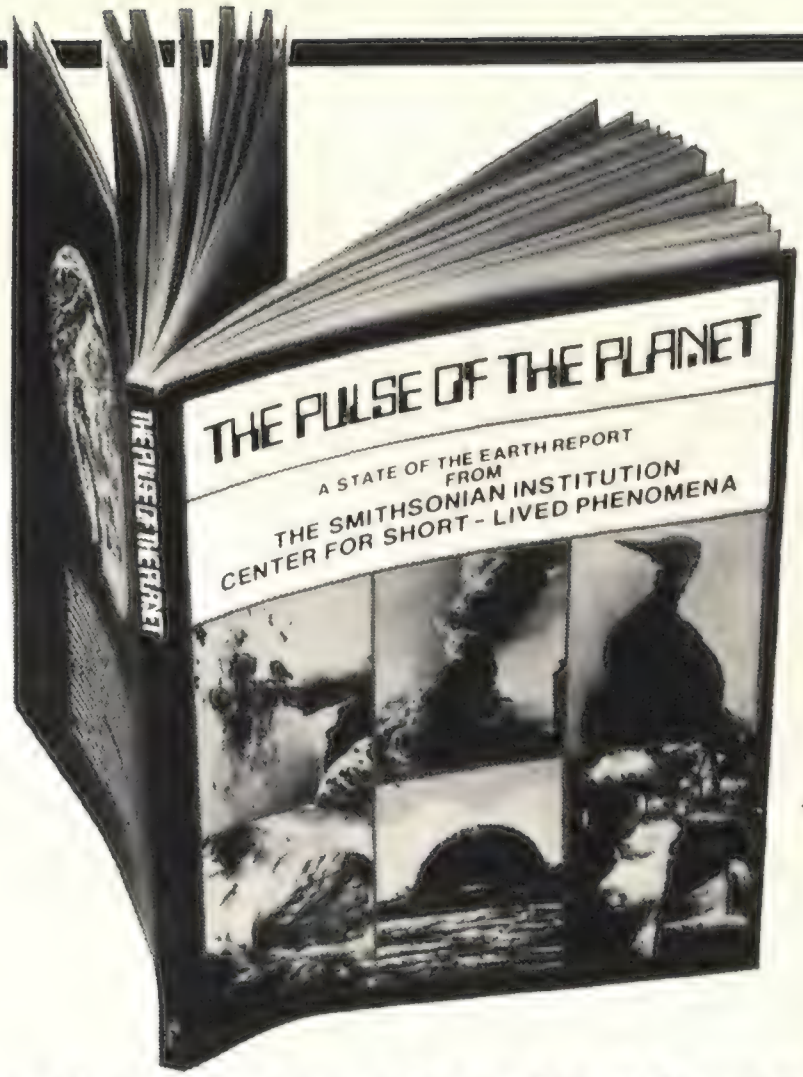
Bullard's book places its emphasis on 32 color plates, but these are its least satisfactory aspect. The three plates which I examined against originals at the National Gallery of Art show that these reproductions intensify, shift the balance of and, in some cases, actually distort Mary Cassatt's colors.

In the original, *The Boating Party*'s sea is a muddy blue with gray and purple overtones. In the reproduction it is turquoise. More horrifying, the green boat has become yellow.

In *Girl Arranging Her Hair,* one sees a nightdress with grayish-blue shadows instead of the whitened blues-into-turquoise shadows of the original. In *Mother and Child* there are distinct distortions of color in the woman's dress, which should be green instead of yellow, in the chair and in the skin tones.

In all three cases there is a heightening of the Cassatt palette into the range of Van Gogh and a corresponding loss of its delicate complexity. The National Gallery of Art should insist on more scrupulous color reproduction for any publication with which (as in this case) it allows its name to be associated.

—Meryle Secrest
Author of SMITHSONIAN article (March 1971) on the artist Romaine Brooks



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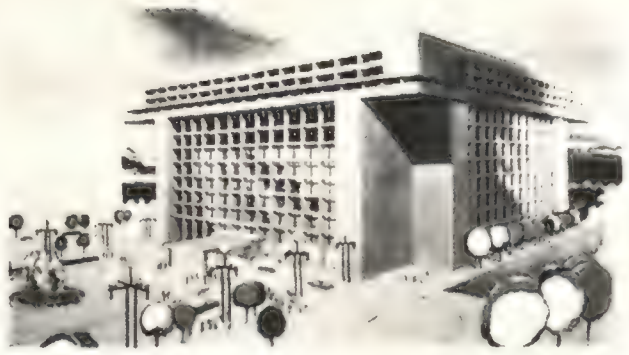

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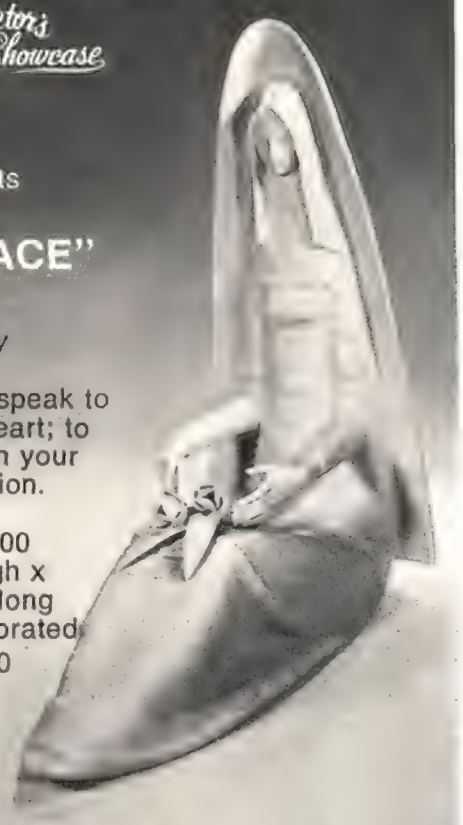

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Museum of History and Technology

"Henry R. Luce Hall of News Reporting" will provide an audiovisual chronicle of the colorful history, important personalities and technological advances of American journalism; opens April 30.

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an illustrated lecture by Dr. Ju-Hsi Chu of Oberlin College in the series on oriental art, will be presented in the gallery auditorium on April 10 at 8:30 P.M.

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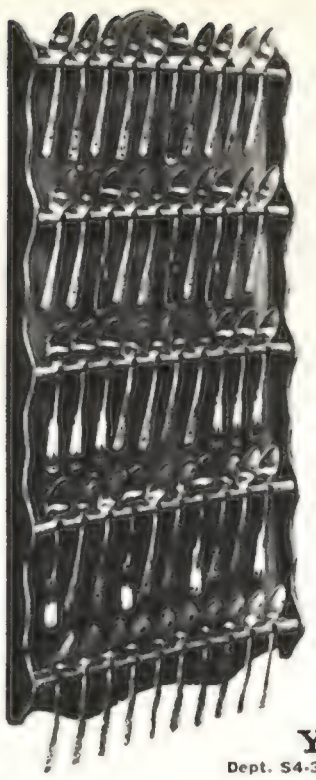

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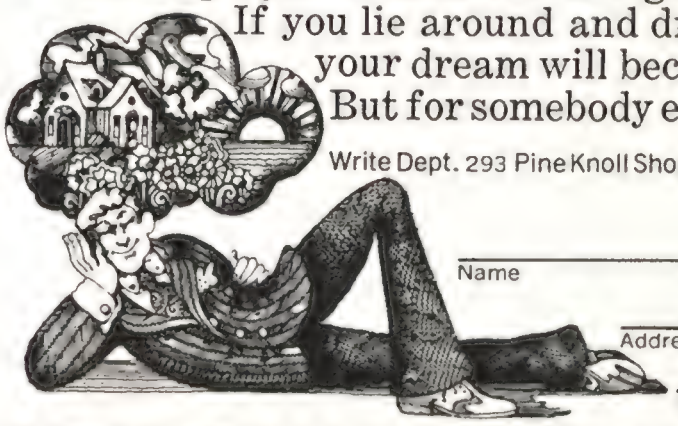

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Tours for Associates

Study tours are designed as educational travel for members of the Smithsonian Associates. Smithsonian staff or other experts accompany all tours. For information, see below.

Foreign Study Tours

For information: Miss Bliss Schumann, Room 123 SI, Smithsonian Institution, Washington, D.C. 20560.

Baroque Tour: Baroque architecture in Germany, Austria and Switzerland, plus medieval tours and visits to private and public art collections—May 11-June 2.

Russian Museum Tour: Moscow, Leningrad, Samarkand, Tashkent and Siberia are the places visited in this three-week tour of Russia's cultural institutions—May 31-June 22.

African Safari: Tanzania and Kenya game parks, plus the Seychelles in the Indian Ocean—July 17-August 7.

Mexico and Guatemala: A visit to historic sites of Yucatán, Oaxaca, Mexico City, Tikal and Antigua (depart from and return to Miami)—August 27-September 14.

Aerospace Museums: A nontechnical tour of these special museums in Munich, Lucerne, Moscow and London—September 17-October 3.

Copernicus: Travel through the cities where Copernicus lived and worked, including Krakow, Frombork, Torun and Warsaw in Poland, and the Italian cities of Bologna and Padua—October 1-21.

Domestic Study Tours

For information: Mrs. Patricia Kilkenny, Room 106 SI, Smithsonian Institution, Washington, D.C. 20560.

Family Weekend: View an exhibit in the making; tour a restored gristmill; take a highlight tour of Washington, D.C.; choose from field trips that include the National Zoological Park and the Chesapeake Bay Center for Environmental Studies—April 13-15.

Folkcraft and Musical Instrument Makers: Talk to and watch traditional craftsmen, musical-instrument makers, weavers, potters and others at work in Kentucky, North Carolina and Virginia—April 23-29.

Skylab Launch: View the double launch of Skylab and the three-man crew. Tour includes briefing and guided tour of NASA facilities—mid-May.

Skin Diving on the Santa Maria Site: Skin-dive at the site if you desire and explore the beauties of Cap-Haïtien, Port-au-Prince, the Citadelle and Tortuga Island—May 13-23.

Vanishing Indian Crafts: Southwestern tribes demonstrate their ancestral crafts and how they are keeping them alive—the weeks of May 11, 18 and 25.

Olympic National Park: Visit Washington's alpine meadows, mountains, lakes and rain forests; take side trip to Victoria, British Columbia—June 24-July 1.

Alaska Float Trip: Starting at Anchorage, join in a six-day float trip down the Copper River, followed by an extended cruise through Prince William Sound—July 18-August 1.

California Colonial History: Explore the architecture and history of Hispanic California from Los Angeles to San Francisco—September 22-29.

Acadia National Park, Maine: Experience the craggy shores and rugged cliffs of this New England national park—September 13-18.

Sea and Shore Laboratory, Charlotte Harbor, Florida: Using the facilities of Mote Marine Lab, participate in ongoing research problems concerning birds and shallow-water animals—October 11-18.

"Düsseldorf Academy and the Americans" shows the watercolors and drawings of the professors of the Düsseldorf Academy, Germany, and their most famous American pupils during the mid-19th century; opens April 28.

Division of Performing Arts

For ticket information on the following presentations, call (202) 381-5395.

The puppet theater performance of "Alice in Wonderland" opens with a week of preview performances for $1 starting April 18, at the A. & I. Building. Performances are at 10:30 and 11:30 A.M., Wednesday through Friday, and at 10:30 A.M., 12:30 and 2:30 P.M. Saturday and Sunday.

"Music from Marlboro," the last in this series of chamber concerts, includes works of Mozart, Mendelssohn and Fauré; it will be performed at 5:30 P.M. on April 7 in the Baird Auditorium.

National Portrait Gallery

"Authors" is an exhibition of portraits of famous American writers from the permanent collection; opens April 8.

"The Black Presence in the Era of the Revolution, 1770-1800" is a unique exhibit of 250 little-known portraits and items of the period assembled from public and private collections throughout the country; April 26-September 3.

Traveling Exhibition Service

There are up to 70 different Smithsonian-sponsored exhibitions on display each month throughout the United States and Canada. For a complete listing and information on how to bring an exhibit to your area, write: Traveling Exhibition Service, Smithsonian Institution, Washington, D.C. 20560.

- Laramie, Wyo.—"Paintings by Edwin Scott" (University of Wyoming Art Museum, Apr. 14-May 13).
- Montgomery, Ala.—"The Avant-Garde in Theatre and Art" (Montgomery Museum of Fine Arts, Apr. 14-May 13).
- Memphis, Tenn. — "Contemporary American Drawings" (E. H. Little Gallery, Memphis State University, Apr. 14-May 13).
- Dallas, Tex.—"Molas From the San Blas Islands" (University of Dallas, Apr. 14-May 13).

- Washington, D.C.—"The Nag Hammadi Codices" (Wesley Theological Seminary, Apr. 14-May 13).
- Minneapolis, Minn.—"Samit" (The American-Scandinavia Foundation, Apr. 14-May 13).
- New York, N.Y.—"Greenland: Arctic Denmark" (American Museum of Natural History, Apr. 14-May 17).
- Dover, Del.—"African Arts" (Delaware State College, Apr. 14-May 13).

Musical Weekend in Washington

The Friends of Music at the Smithsonian and the Division of Musical Instruments announce their second weekend of music, May 4-6. The tour includes concerts and receptions at the Smithsonian and other Washington cultural centers. For information write: Mrs. Lois Howard, Museum of History and Technology, Room 4125, Smithsonian Institution, Washington, D.C. 20560.

Smithsonian Commons

Luncheon facilities for members of the Smithsonian Associates are in the original Smithsonian Building. Open Monday through Friday from 11:30 A.M. to 2 P.M., the Commons offers a buffet luncheon from $1.40 to $1.85 upon presentation of an Associate membership card.

Parking on the Mall

Metro construction has made parking on the Mall near the Smithsonian complex extremely difficult. Effective in early spring, all parking will be restricted to museum visitors only after 10:00 A.M. The use of fringe parking areas and/or public transportation is recommended. Current parking information may be obtained by writing to the Smithsonian Associates' Reception Center prior to your visit.

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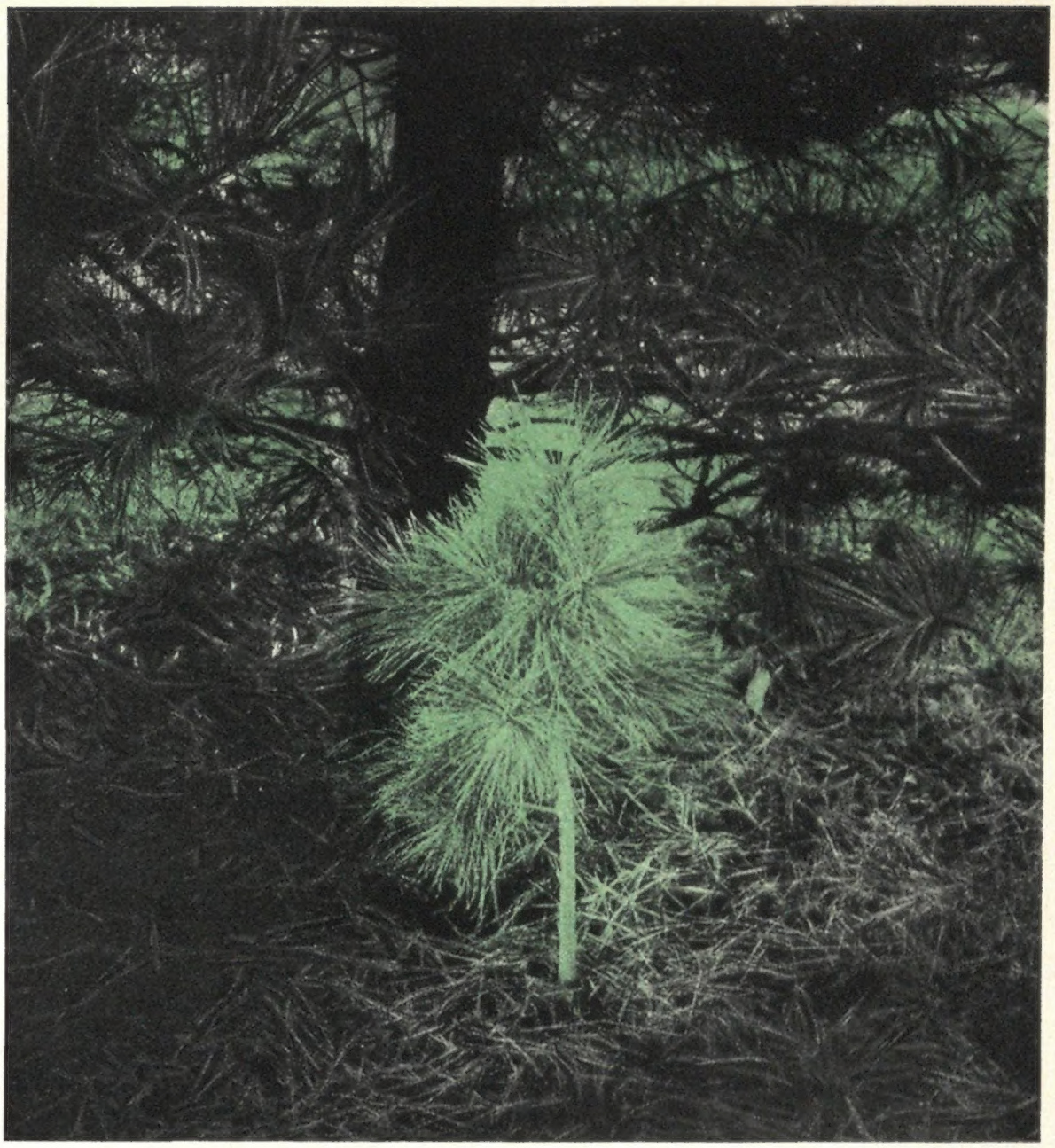

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By Patrick Ryan

Anglers' Heaven, a celestial pond

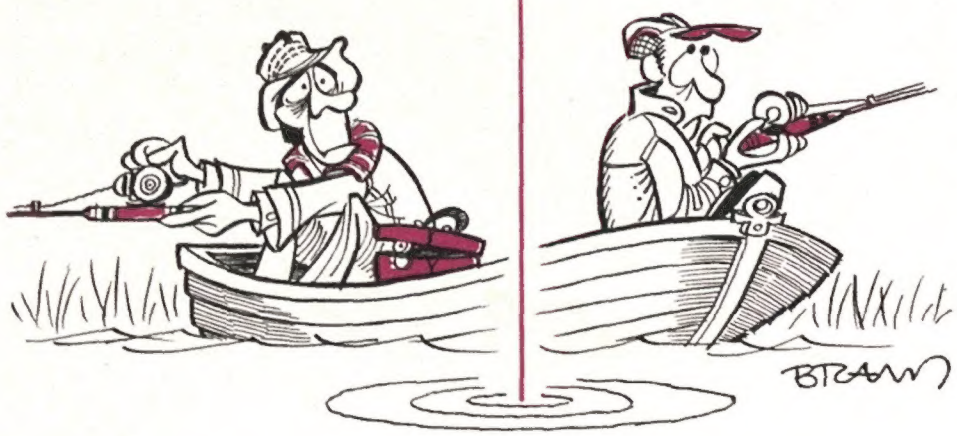
Addicted anglers, watching their floats or flicking their flies, may not have had a spare eye to note that a significant turning point in the history of fishing was passed recently in Kidderminster, England. In a contest for their fishing championship, 200 National Ambulance Servicemen sat along a canal for five hours and never caught as much as a tiddler among them. All of them would be there still—thrashing the waters to a desperate foam—if a local resident hadn't taken pity on them and revealed that the canal had been drained and refilled three weeks earlier, and all the fish removed.

From a safe distance, guffaws at 1,000 man-hours of frustration cannot be suppressed entirely. Ever since Izaak Walton so massaged their egos in *The Compleat Angler,* fishermen have considered themselves a mystical step or two above the rest of us. Izaak further inflated their vanity by describing the whole muddy business as "the most honest, ingenuous, quiet and harmless art of Angling." Patently, of course, fishermen are just people who make a virtue out of idleness and find diversion in the chilly damp. Though they are wont to congratulate themselves as philosophers of the riverbank, spiritually mellowed by float-contemplation and fly-twitching, success in their pastime demands that they be dedicated to much of the worst in human nature.

Cold cruelty is required to impale a live and wriggling fellow creature—be it worm or minnow—on the point of a hook. As immortalized by the gentle Izaak instructing his pupils, when baiting for pike with a live frog, you "put your hook, I mean the arming-wire, through his mouth, and out at his gills, and then with a fine needle and silk sew the upper part of his leg with only one stitch to the arming-wire of your hook. . . ."

The inhumanity of a Herod is necessary to haul ashore, by means of a metal talon embedded in its mouth, one of our own evolutionary relatives. And brazen mendacity is essential to anglers when they are describing with extravagant gestures the dimensions of the one that got away.

With such a weight of barbarity blacking their souls, it would seem a confident prophecy that on Judgment Day fishermen will face long odds against getting into the Kingdom of Heaven. Yet it must be admitted that, compared with hunters, they do little harm to other human beings with their solitary vice. Many of them, crouching with empty nets in a gray drizzle, actually wreak little depredation on the fish. And they will undoubtedly enjoy a certain amount of pull when it comes to inquiring at the Golden Gates, for St. Peter was a fisherman, too. So were at least three of the other Apostles. A sense of gratitude may also emanate from higher up because, while the feeding of the 5,000 was considerably assisted by the five loaves, some helpful angler had made possible the two fish. Which makes us wonder whether Heaven may turn out to be not an Elysian field with continuous harping and hosannas, but a vast celestial fishpond around which sit immortal anglers, their rods upheld by cherubim, their lines baited by seraphim, with old Izaak himself, sewing a fine stitch down a frog's leg, sitting upon the right hand of the ultimate Fisher of Men.



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